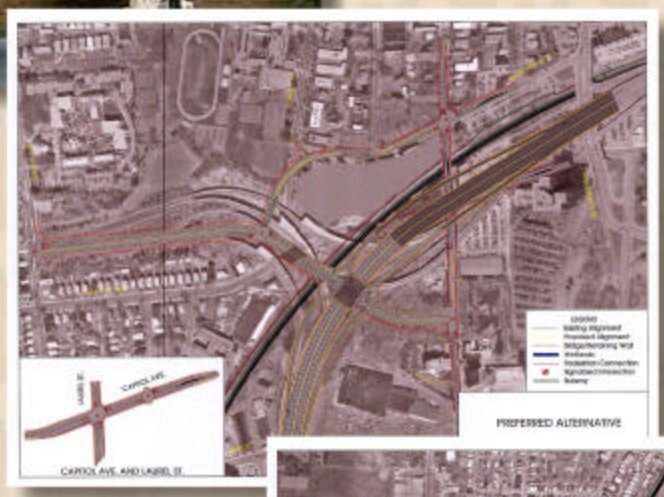
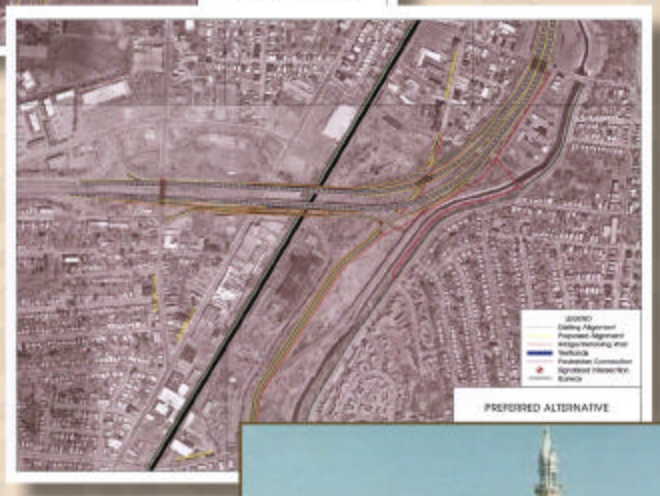
Final Report

I-84 WEST SIDE ACCESS STUDY





ENGINEERS
PLANNERS
ECONOMISTS

Wilbur Smith Associates

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Final Report

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Prepared For

CONNECTICUT DEPARTMENT
OF TRANSPORTATION

By

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October 2001

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ES 1.0 Background and Study Purpose

The purpose of this study is to determine the need and define changes that could be made to improve the Prospect Avenue, Flatbush Avenue, Sisson Avenue, and Sigourney Street interchanges along Interstate 84 (I-84). In addition to operations along I-84, this study focuses on local key locations in the vicinity of the freeway in the towns of Hartford and West Hartford. The study area is illustrated in Figure 1.3.1 in the body of the final report. Modifications include eliminating left hand on and off-ramps, and providing a full-access interchange at Flatbush Avenue. Additional travel lanes to increase capacity of I-84 is not being considered for reasons described in the paragraph that follows. For the purpose of this study, a new exclusive bus rapid transit (BRT) facility, the New Britain-Hartford Busway (which is being developed through a separate project) is assumed to be fully operational by the year 2020. The busway is proposed to be located along an existing Amtrak rail right-of-way within the corridor.

The Connecticut Department of Transportation (ConnDOT), in cooperation with the Capitol Region Council of Governments (CRCOG) and the Federal Highway Administration (FHWA) completed a Major Investment Study (MIS) in March 1999 that evaluated transportation alternatives in the I-84 corridor between Hartford and Farmington (Hartford West). The MIS evaluated a variety of Reasonable Alternatives Packages (RAPs) to address transportation needs in the Hartford West corridor. The Hartford West study area included portions of towns/cities of: Hartford, West Hartford, Newington, New Britain, and Farmington. The MIS recommended a package of improvements that would benefit local communities, the region and the state as a whole. The MIS recommended a hybrid RAP, including: Construction of the New Britain – Hartford busway; Reconstruction of Flatbush, Prospect, Sisson and Sigourney interchanges (Westside Access Project); Reconstruction of Routes 4, 6 and 9 interchanges; Improvements to local bus service; Support for arterial roadways; Transportation Demand Management; and Land-use regulations to support transit (Transit Oriented Development). For the Westside Access study area, the MIS evaluation determined that it would not be reasonable to add additional travel lane capacity on I-84 because of the anticipated social and environmental impacts, expense, and public opposition associated with such an action.

ES 1.1 Transportation Needs in Study Area

The roadway modifications presented in this West Side Access study, if pursued, would address the following needs:

- Peak Hour Traffic Operations on I-84 and Parallel Arterials,
- I-84 Highway Connectivity,
- Access from the Farmington Valley to the Hartford Central Business District

In addition to these transportation needs, there are other equally pressing matters of significant localized concern, such as undesirable traffic volumes in neighborhoods abutting I-84 or busy arterials in the study area.

ES 1.2 Peak Hour Traffic Operations on I-84 and Parallel Arterials

The suggested modifications would address peak hour traffic operations in the study area communities. Congestion on major roadways is chronic and recurring during the peak hour, particularly on I-84 and on parallel roadways. Future traffic volumes are expected to grow, and the peak period of congestion is expected to increase in duration.

ES 1.3 I-84 Highway Connectivity

Some congestion may be caused by the indirectness of travel, introduced on the network by poor connectivity. Poor connectivity may be one of two types: lack of connectivity (incomplete interchange access) or a poorly designed or substandard connection. Two of the existing I-84 interchanges could be modified to reduce or eliminate substandard exiting or merging areas. They are the Flatbush Avenue and Sisson Avenue Interchanges.

ES 1.4 Goals and Objectives for Corridor Improvements

Transportation Goals and Objectives were the cornerstone for evaluating alternative transportation improvements. To evaluate the potential for success of the strategies, the Technical Advisory Committee (TAC) members defined a set of Goals and Objectives. The following five goals were supported by a comprehensive set of specific objectives and related performance measures: Modal Choices, Congestion Reduction, Public Health and Safety, Economic Development, and Community Livability & Quality of Life.

ES 1.5 Study Area and Neighborhood Characteristics

The study area in Figure 1.3-1 in the complete final report includes five defined neighborhoods within the City of Hartford – Asylum Hill, Behind the Rocks, Frog Hollow, Parkville and West End – and the Elmwood neighborhood within the Town of West Hartford. The roadway modifications presented as a result of the West Side Access study would improve access to educational institutions, both within and outside the West Side Access study area and facilitate reconnecting the community.

ES 2.0 Alternatives Considered

Since the Hartford West MIS was begun, various alternatives have been developed for the I-84 corridor within the study area. Through the evolution of the MIS, the resolution for this portion of I-84 was that there would be no additional through lanes added, but concepts would be developed to improve overall operations, safety and access to the local neighborhoods. A number of iterations for roadway modifications were evaluated in coordination with the study TAC, CRCOG, affected municipalities, and neighborhood groups. This study evaluates the Build Alternative, which was developed through this effort against a baseline No-Build Alternative.

ES 2.1 No-Build Alternative

The No-Build Alternative assumes that no actions are performed within the study area other than projects that are currently programmed or routine maintenance and operation of the existing transportation system.

ES 2.2 TSM/TDM Alternative

The Transportation Systems Management/Transportation Demand Management (TSM/TDM) Alternative includes a broad range of low-cost, localized improvements to improve traffic flow, increase safety, and reduce travel demand without major capital investment or construction. These easily implemented measures were studied in the Hartford West MIS and would only have a minor effect in addressing the purpose and need of the project.

ES 2.3 Build Alternative

The study area encompasses the I-84 interchanges beginning at Prospect Street and ending at Sigourney Street. The majority of changes considered would occur at the Flatbush Avenue and Sisson Avenue Interchanges. The suggested roadway modifications would reconfigure the Prospect Avenue, Flatbush Avenue, Sisson Avenue, and Sigourney Street interchanges along I-84. In addition to addressing operations along I-84, this study investigates potential improvements to key locations in the vicinity of the freeway in the towns of Hartford and West Hartford. The conceptual plan developed as a result of this investigation includes:

ES 2.3.1 Prospect Avenue Interchange (Exit 44)

The Prospect Avenue Interchange is primarily located in the Town of West Hartford. During the early phases of alternatives screening, the Town of West Hartford indicated that they did not see a need to modify the access at this interchange as it served the needs of their community.

ES 2.3.2 Flatbush Avenue Interchange (Exit 45)

The modifications to the Flatbush Interchange would provide the missing access to/from the west and also provide a new connection to the Parkville industrial corridor. The first major change in this interchange is the construction of what is referred to in this report as the Bartholomew Avenue Extension. This new local city street would begin at Flatbush Avenue at the existing terminus of the Flatbush Avenue ramps. This two-way roadway would contain two lanes (one lane in each direction) with a center median.

In the eastbound direction, a new off-ramp to Bartholomew Avenue Extended would begin after the existing off-ramp to Prospect Street. This new ramp would traverse under the Prospect Street overpass, under a reconfigured Prospect Street on-ramp overpass, then over New Park Avenue, over the proposed busway and Amtrak rail right-of-way, and then down to an at-grade intersection with Bartholomew Avenue Extended. The existing eastbound on-ramp from Flatbush Avenue would be replaced with a new shorter ramp beginning at the at-grade intersection of Bartholomew Extended with the eastbound off-ramp. The on ramp would climb

up to merge into a right-side I-84 auxiliary lane that would be marked exit only to the Sisson Avenue eastbound off-ramp.

In the westbound direction, traffic destined for the Flatbush Avenue interchange would follow the following path: An auxiliary right lane would serve merging and weaving traffic entering and exiting between the Sisson and Flatbush Avenue interchanges. A right-hand off-ramp to Bartholomew Avenue would then replace the left-hand off ramp to Flatbush Avenue that exists today. The off-ramp would drop down to an at-grade intersection with the new Bartholomew Avenue Extended roadway. The new westbound on-ramp would begin at this at grade intersection; rise up and over the Amtrak right of way, merging with I-84 into an auxiliary lane that would then exit at the Prospect Street westbound off-ramp.

In conjunction with the interchange reconfiguration, a new multi-use pathway could be provided to begin at Flatbush Avenue, travel parallel to Bartholomew Avenue Extended on the east side, connecting to the existing Bartholomew Avenue sidewalk north of I-84. The pathway would also split and travel parallel to the I-84 Eastbound on-ramp from Bartholomew then travel between I-84 mainline and Wellington Street to Hamilton Street where it could then connect to Pope Park. Additionally, there is a proposal by others to construct a multi-use trail on the east side of the Park River. In order to connect with this trail and the New Britain – Hartford Busway station at Flatbush Avenue, sidewalks could be constructed on the north side of Flatbush Avenue both east and west of the Bartholomew Avenue Extended/Flatbush Avenue intersection. This new interchange configuration is illustrated in Figure 2.3-1 in the complete final report.

ES 2.3.3 Sisson Avenue Interchange (Exit 46)

As with the Flatbush Avenue Interchange, the Sisson Avenue Interchange was originally constructed to be part of a freeway to the north with local connections to Sisson Avenue. The freeway to the north was never built and is not anticipated. Therefore, the ramp structures that exist today are not required. Additionally, because the freeway was never built, traffic with destinations to the north must all funnel through the Sisson Avenue interchange at one point. The new interchange configuration is illustrated in Figure 2.3-4 in the complete final report.

Mainline I-84 through the interchange area would be realigned to eliminate the existing reverse curve. The existing ramp structure would be removed and a new city street (Boulevard Extended) would connect Sisson Avenue with Laurel Street. This new roadway would then have a single-point interchange connection with I-84. The Boulevard Extended roadway is intended to be a four-lane roadway with a median. Because of this new roadway, the configuration of the Hawthorn Street/Forest Street intersection would be reconfigured. This modification would connect Hawthorn Street with the new Boulevard Extended at an at-grade signal-controlled intersection. Forest Street would be maintained as a one-way south-bound roadway with a connection to Hawthorn, designed such that only a left-turn onto Hawthorn would be permitted. Additional improvements would be required at the Laurel Street/Hawthorn and Laurel Street/Capitol Avenue intersections.

The new single-point interchange configuration would provide right-hand ramps from the mainline as well as provide adequate capacity at the Boulevard Extension and freeway ramp

intersection. The existing freeway ramps, some of which are left-hand ramps, would all be removed. This interchange reconfiguration would provide the opportunity to return substantial pieces of land to the City or local property owners. Pedestrian/bicycle facilities have also been included in this plan. This would include providing sidewalks along all new roadways that would be City streets.

ES 2.3.4 Sigourney Street Interchange (Exit 47)

No changes to the Sigourney Street Interchange are included in the Build Alternative for this study.

ES 3.0 Traffic Operations Evaluation

The existing transportation conditions and anticipated effects associated with the Build and No-Build Alternatives in the study corridor are summarized here.

ES 3.1 Safety

Accident records for I-84 from the most recently available three-year period, October 1996 to September 1999, were analyzed. The number of accidents for the corridor as a whole has been increasing each year since 1996. The study surveyed accident rates, lighting conditions, pavement surface conditions, accident severity, accident type, truck related accidents, contributing factors (driving to fast, etc.), time of day and day of week, direction of travel and ramp accidents, and suggested list of surveillance sites.

The roadway modifications being considered with the Build Alternative would address a number of safety concerns throughout the corridor. The elimination of left hand on and off ramps at Flatbush Avenue and Sisson Avenue Interchanges would substantially reduce the number of accidents at these locations with the provision of right hand entrance and exit ramps. The provision of a full interchange at Bartholomew Street (Flatbush Avenue) would eliminate confusion for drivers looking for an exit ramp to Flatbush Avenue from the west. The provision of a smoother alignment with more gradual curves along I-84 from the east through the Sisson Avenue Interchange would eliminate a number of driver maneuver concerns. The provision of an additional auxiliary lane in each direction between Exits 45 and 46 and full inside and outside shoulders should reduce the occurrence of accidents along I-84 between Flatbush Avenue and Sisson Avenue and between Sisson Avenue and Sigourney Street.

The No-Build Alternative would not address any deficiencies of the existing roadway system.

ES 3.2 Travel Speed

The existing travel speeds in the corridor and the associated impact of the roadway modifications on the travel speeds in the corridor were evaluated and are summarized here.

Average travel speed is a reliable indicator of roadway congestion. The study team preformed speed and delay runs on I-84 and other arterials within the study area. The A.M. peak hour is

7:30 A.M. to 8:30 A.M. and the P.M. peak is from 4:30 P.M. to 5:30 P.M. The Midday peak constitutes 1:00 P.M. to 2:00 P.M. Traffic entering downtown Hartford during the A.M. peak hour is traveling at a speed between 25 and 35 miles per hour east of Exit 45 due to the merge/diverge and weaving activity. In the westbound direction, traffic is traveling in an off-peak direction and therefore the speeds are in the range of 55 to 65 miles per hour. During the P.M. peak hour, east of Exit 45, traffic is traveling at speeds lower than 20 miles per hour in the eastbound direction. This is due to ramp traffic from different areas in downtown Hartford heading east on I-84. During the midday peak hour, the traffic speed approaches free-flow speeds. Speeds in the eastbound and westbound directions are typically in the 55 and 65 miles per hour range.

The Build Alternative would address travel speed deficiencies through the corridor by eliminating left lane on and off ramps at Flatbush Avenue and Sisson Avenue Interchanges. The changes would reduce the lane changing activity along I-84 and therefore, improve peak hour travel speeds through the corridor.

The No-Build Alternative would not address deteriorating speeds over time.

ES 3.3 Traffic Volumes

The Build Alternative would provide new connections to the local street system that would divert traffic to new routes in the corridor and therefore, certain segments would experience an increase or decrease in traffic volumes. Year 2000 (Existing) traffic volumes on the I-84 mainline and ramps are shown in Figure 3.3-1 in the complete final document. Year 2020 No-Build and Build Volumes are found in Figures 3.3-2 and 3.3-3 in the complete document.

During the A.M. peak hour, I-84 carries approximately 6,250 vehicles per hour in the eastbound direction and 4,250 vehicles per hour in the westbound direction west of Exit 44. During the P.M. peak hour, I-84 carries approximately 4,250 vehicles per hour in the eastbound direction and 6,250 vehicles per hour in the westbound direction west of Exit 44. During the A.M. peak hour, east of Exit 47, I-84 carries approximately 8,100 and 7,080 vehicles per hour in the eastbound and westbound directions respectively. During the P.M. peak hour, I-84 carries approximately 6,520 and 7,530 vehicles per hour in the eastbound and westbound directions respectively.

Farmington Avenue, an east-west street carries approximately 1,080 vehicles per hour during the A.M. peak and approximately 1,445 vehicles per hour during the P.M. peak hour periods. During the A.M. peak hour, approximately 76% of the traffic on Farmington Avenue is headed towards downtown Hartford while during the P.M. peak hour approximately 58% of the traffic travels out of downtown Hartford into adjacent communities. Sisson Avenue is a major north-south street that provides access to and from the I-84 ramps at Exit 46. Sisson Avenue carries approximately 1,010 and 1,135 vehicles per hour during the A.M. and P.M. peak hour periods respectively. Capitol Avenue is a major east-west arterial that connects communities in West Hartford and Hartford to downtown Hartford. This street carries 1,110 and 1,760 vehicles per hour during the A.M. and P.M. peak hour periods respectively. Similarly, during the A.M. peak hour Capitol Avenue carries approximately 76% of traffic into downtown Hartford, while during the P.M. peak hour it carries approximately 74% of traffic out of downtown Hartford. Park

Street is also a major east-west connector to downtown Hartford and carries approximately 940 and 1,240 vehicles per hour during the A.M. and P.M. peak hour periods respectively. Sigourney Street provides access to and from the I-84 ramps from the east at Exit 47 and carries approximately 1,370 and 1,460 vehicles per hour during the A.M. and P.M. peak hour periods respectively.

As a result of the roadway modifications being considered, traffic volumes on Farmington Avenue between Sisson Avenue and Laurel Street would decrease approximately 40% and 20% during the A.M. and P.M. peak hour periods respectively. Volumes on Sisson Avenue between Farmington Avenue and Capitol Avenue would decrease approximately 35% and 25% during the A.M. and P.M. peak hour periods respectively. Capitol Avenue between Sisson Avenue and Laurel Street would experience a decrease in traffic volume of approximately 40% during the A.M. and P.M. peak hour periods. In the southern end of the study area, traffic volumes on New Park Avenue would decrease approximately 30% during the A.M. and P.M. peak hour periods from the No-Build to the Build Alternative.

Traffic volumes along Laurel Street however, would increase by as much as 70% during the A.M. peak hour period north of Hawthorn Street from the No-Build to the Build Alternative. This would be due to the direct connection that would be provided at this location.

ES 3.4 Public Transit

The existing transportation services and facilities in the study area such as public transit services and bicycle routes were examined. Truck movements in the corridor specifically in the vicinity of the freeway ramps were also examined.

Existing public transportation in the study area is focused on the greater Hartford area. A variety of public transportation services serve mobility needs in the Hartford area. These services include CT Transit, New Britain Transportation, Bonanza Bus, Downtown Circulator/Shuttle, Greater Hartford Transit District Paratransit, and Greater Hartford Ridesharing Corporation.

The West Side Access Study anticipates that the New Britain-Hartford Busway would be fully operational by the year 2020. Changes in travel patterns due to the New Britain-Hartford Busway were taken into consideration in the assessment of year 2020 future travel conditions. The New Britain-Hartford Busway is an exclusive roadway for buses to be located along the existing Amtrak railroad right of way, that would link downtown New Britain with downtown Hartford and Union Station. Therefore stations are planned along the busway.

When the New Britain-Hartford Busway is fully operational there are a number of changes to other existing transit routes that would take place to better utilize the busway and serve the corridor. All express buses that operate along I-84, such as the Bristol Express, Cheshire/Southington Express, and the New Waterbury Express would use the entire length of the busway between New Britain and Hartford. Some of the local bus routes would be re-routed to better connect with the busway. Within the West side Access Study area the Burritt Street service in Hartford would be rerouted. In addition, there are proposed changes to feeder services along the busway corridor. Within the West Side Access Study area, the Elmwood-West

Hartford shuttle is a new route that would connect the West Hartford Center to the Elmwood Station. The Oakwood Avenue Station route will provide a new route that would connect Flatbush Station to West Hartford Center via New Park Avenue, Oakwood Avenue, and Farmington Avenue. Existing CT Transit routes W2, Q2, Q3, Q4, K4, and K5 would be modified to better utilize the busway.

The No-Build Alternative would not affect public transportation.

ES 3.5 Bicyclist and Pedestrian Needs

Bicycle riders and walking pedestrians are important users of the transportation system and encouraging use of these alternative modes is an interest of ConnDOT and CRCOG. As noted in the MIS, approximately 10 percent of Hartford residents walk to work.

Designated bicycle routes for the state have been developed by ConnDOT and published in their Connecticut Statewide Bicycle and Pedestrian Transportation Plan (March 1999). This document describes the plans from different regional planning associations at the time of publication and gives general guidelines for bike route and path development. In addition, ConnDOT has produced a statewide Bicycle Map. Bicycle accommodation within the study area is limited. The complete final report for this study illustrates (Figure 3.10-1) the routes and trails that exist in the study area based on the statewide bicycle map.

To understand the pedestrian needs in the corridor, an inventory of existing sidewalks, crosswalks, and street lighting was undertaken throughout the study area. The results of the field surveys indicated that sidewalks and crosswalks did exist in many locations along the corridor. Adequate street lighting was provided on one side of the roadway, if not both sides of the roadway. The major arterial routes that were surveyed were Farmington Avenue, Capitol Avenue, Park Street, Flatbush Avenue, Sigourney Street, Hawthorn Street, and Laurel Street. Each of these arterial routes are described in detail in the complete final report.

Providing the multi-use trail as included in the Build Alternative for walking and bicycling would increase neighborhood connectivity. Improving sidewalks and lighting conditions along the study area would also provide greater opportunity to reconnect the community and interference with existing bicycle routes would be minimized.

The No-Build Alternative could affect conditions for pedestrian and bicyclists if local traffic volumes increase.

ES 3.6 Intelligent Transportation Systems (ITS)

I-84 in the study area is presently part of an incident management system managed jointly by the City of Hartford Traffic Control Center and the ConnDOT Center in Newington. The need and opportunity to further supplement this system would be considered during the development of the design. In addition, traffic signals may be included in the City of Hartford's Traffic Signal System.

ES 4.0 Social and Environmental Concerns

The existing social and environmental conditions and anticipated effects associated with the Build and No-Build Alternatives are summarized here.

ES 4.1 Noise

Existing noise levels were monitored and modeled using the FHWA's Traffic Noise Model (TNM) and the model was calibrated based upon monitored values. Noise levels for future year 2020 No-Build and Build scenarios were estimated using the TNM model to predict noise levels at representative receptors. The FHWA Noise Abatement Criteria (NAC) recognize an impact when noise levels "approach" (come within 1 dBA) of the NAC. The monitoring indicated that three locations would approach or exceed the NAC under existing conditions.

Modeled year 2020 No-Build noise levels are in all cases higher than the existing monitored values for AM or PM peak periods, based upon a conservative modeling methodology. There are no locations in the study area where future build noise levels increase by 15 decibels (dBA) over existing conditions (ConnDOT impact determination of "substantial increase"). At many locations, noise levels associated with the Build Alternative would will actually decrease below existing levels.

Four receptors would have noise levels after construction that would approach, equal, or exceed the NAC. The potential for providing noise walls was considered at these four receptors as a mitigative measure. Only one barrier would be feasible and reasonable, based upon ConnDOT and FHWA policy for determining barrier effectiveness and cost-effectiveness.

A noise barrier near the eastbound off-ramp to Prospect Avenue (Caya Avenue) would abate noise at an apartment building at 98 Caya Avenue (on the first floor), along with single family homes further to the west along Caya Avenue. A noise barrier 5 meters (16.4 feet) in height would achieve a 7 dBA reduction at the apartments, would be expected to cost about $79,500 and would be expected to benefit an estimated 19 dwelling units. A wall at this location would be considered as a mitigative measure during the design phase.

The No-Build Alternative would not create any additional noise impacts to the study area, but locations impacted by high existing noise levels would continue to be impacted.

ES 4.2 Air Quality

The air quality modeling analysis for the Build and No-Build Alternatives consisted of a microscale (local area) analysis to estimate maximum one- and eight-hour CO concentrations at seven intersections within the study area.

All estimated CO concentrations would be less than the National Ambient Air Quality Standards and no adverse air quality impacts would be expected due to implementation of the Build Alternative.

The No-Build results are roughly the same as the levels for the Build Alternative, and no exceedances of the CO standards are expected at any locations with in the study area.

ES 4.3 Land Use and Zoning

The study area for land use and zoning analysis is located between the Sigourney Street interchange in the Asylum Hill neighborhood of the City of Hartford and the Trout Brook Drive interchange area in the Town of West Hartford. It includes five defined neighborhoods within the City of Hartford – Asylum Hill, West End, Parkville, Frog Hollow and Behind the Rocks – and the Elmwood neighborhood within the Town of West Hartford.

Generally, land use impacts associated with a transportation program are considered to fall within two categories: Primary and Secondary impacts. This categorization has been used to identify the type and level of impact associated with the two major modifications developed by this study.

The No-Build Alternative would not create adverse socioeconomic effects or land use changes, nor would it offer beneficial effects as described below.

Sisson Avenue

Primary Impacts

The relocation of highway structures and roadway realignment anticipated within the West Side Access Improvement Program would occur primarily within existing highway right-of-way. Therefore, the primary environmental consequences for land use and zoning are expected to be minimal.

The realignment of Sisson Avenue interchange and the extension of Hawthorn Street to the west would require the taking of approximately 3,000 square feet of property within the Hartford High School campus. This parcel is currently vacant and unused.

Secondary Impacts

The access changes that would result from the Sisson Avenue realignment would be likely to enhance the value of adjacent commercial and institutional properties. In particular, the creation of a direct interchange connection to the Aetna campus would be beneficial.

Flatbush Avenue

Primary Impacts

The configuration of the interchange at Bartholomew Avenue would minimize the land acquisition required for this modification. A limited amount of property taking may occur within the undeveloped portion of the Crown Theater property to the south of the existing elevated highway structure.

Secondary Impacts

The creation of a full interchange with Bartholomew Street extended and improved access to Flatbush Avenue, in place of the existing partial interchange to Flatbush would improve access to commercial and industrial properties located in the adjacent area. In particular, this would affect the large-scale, mixed-use commercial development anticipated on the former Charter Oak and Rice Heights public housing sites.

ES 4.4 Wetlands

The study area is heavily urbanized with few wetlands and surface water resources. Of those that are present, most are located in the vicinity of the Flatbush Avenue and Prospect Avenue interchanges with I-84. There are no wetlands or water resources associated with the Sisson Avenue interchange area other than a man-made detention basin located east of Laurel Street and south of I-84 on property occupied by the Park Towers apartment complex. A total of 12 wetland areas near the Flatbush Avenue interchange were evaluated. The field review was based upon visual observation, and did not include a formal wetlands delineation, which would be performed during further development and design of the project, if pursued. Surface waters are discussed in greater detail in Section 4.5 of the complete final report.

A total of 0.52 hectares (1.2 acres) of six different wetlands may be impacted by the Build Alternative. The removal of the existing Flatbush Avenue on-ramp would offer opportunities to re-connect two wetland areas that have been separated by the ramp. Two wetlands, which currently are 2.4 hectares (6.0 acres) and 2.3 hectares (5.7 acres) respectively, would be joined together by 1.6 hectares (3.9 acres) of new mitigation area. Since one wetland would also experience a minor impact, the total combined wetland area would be 6.2 hectares (15.4 acres) in size.

Limiting the extent of the fill slope at four wetlands by either utilizing a steeper-than-usual slope or by constructing a retaining wall would avoid or minimize impacts on these wetlands.

It is anticipated that any permanent loss of wetlands due to the Build Alternative would be compensated through a comprehensive wetland mitigation plan that would be formulated in cooperation with the appropriate regulatory agencies (Army Corps of Engineers and/or Connecticut DEP).

The No-Build Alternative would not create any impacts on wetlands.

ES 4.5 Surface Waters

The following surface water resources are found in the study area: North Branch of Park River at Farmington Avenue (Hartford), South Branch of the Park River (Hartford), Kane Brook (Tributary to South Branch of Park River) (West Hartford and Hartford), Saint Joseph's Brook (West Hartford), and Open Water Pockets on West Side of Industrial Drive (Hartford).

At the northern end of the wet meadow located between the existing Flatbush Avenue on- and off-ramps, Kane Brook flows eastward towards the South Branch of the Park River. The alignment in this location would include a new I-84 eastbound on-ramp to be constructed from the Bartholomew Avenue Extension. Additionally, a new pedestrian connection paralleling the east side of Bartholomew Avenue Extension would be accommodated in this location.

Potential impacts during construction and long-term impacts to water quality associated with increased runoff, erosion, and sedimentation would be mitigated through the drainage design and the project's stormwater pollution prevention plan, which will incorporate BMPs both during and post-construction.

The No-Build Alternative would not create any impacts on surface waters.

ES 4.6 100-Year Floodplains and Floodways

Within the study area, designated 100-year floodplain areas are limited to Kane Brook and the South Branch of the Park River. There are no 100-year floodplain areas in the vicinity of the Sisson Avenue interchange reconfiguration and associated roadway modifications. There are three locations where the designated 100-year floodplain would be directly impacted by the Flatbush Avenue interchange modifications.

Impacts on the 100 year floodplain associated with Kane Brook, that would be impacted by fill or by the toe of fill slope, the extent of the floodplain fill in terms of volume will not be formally quantified until design phase, such that impacts on flooding can be exactly assessed.

At the three floodplain areas near Flatbush, a total of 2.6 hectares (6.4 acres) potentially would be affected by the roadway changes.

Floodplain encroachment would warrant carrying out mitigation. Measures could include, a compensatory flood storage plan, and/or flood-proofing measures for existing structures. Coordination with DEP would take place during final design in this regard.

The No-Build Alternative would not create any impacts on Floodplains.

ES 4.7 Section 4(f) and Section 6(f) Properties

Section 4(f) sites include public parks, recreation lands, wildlife and waterfowl refuges, and historic sites. Section 6(f) sites include outdoor recreation areas that were acquired or developed with funds from the Land and Water Conservation Fund (LAWCON).

There would be no direct impacts to four of the five public parks and recreational areas located within the study area that are classified as both Section 4(f) and Section 6(f) resources.

The extreme southeastern corner of Hartford Public High School (HPHS) property would be impacted by the realignment of the western end of Hawthorn Street. Hawthorn Street would be realigned to curve towards the southwest and cross Forest Street at-grade at a point south of the

existing Forest Street/Hawthorn Street "T" intersection. It would then cross over the extreme southeastern corner of HPHS property prior to eventually intersecting with the new Boulevard Extended. The impacted area on HPHS property is presently occupied by material stockpiles and construction equipment, and appears to be a temporary staging area for nearby construction.

There would be a minor adverse impact on a Section 6(f) property (HPHS). The property acquisition is not an impact regulated by Section 4(f). The section 6(f) impacts to Hartford Public High School would be mitigated by the return of property with the removal of the Sisson Avenue ramps. With respect to non-recreational Section 4(f) resources, there are no wildlife or waterfowl refuges located within the study area. Additionally, historic resources listed on or eligible for the National Register of Historic Places would not be directly or indirectly impacted by the interchange modifications (See Section 4.10 of the complete final report).

The No-Build Alternative would not create any impacts on Section 4(f) or Section 6(f) land.

ES 4.8 Hazardous Materials

An environmental records review was conducted for the study area, along with windshield surveys.

Twelve sites within the study area have been the subjects of state cleanup actions. In addition, 27 generators of hazardous wastes have been actively registered over the past thirty years. Five facilities are listed under the ERNS. The CTDEP lists 23 occurrences of leaking underground storage tanks in the study area.

Potential construction impacts include the disturbance of hazardous or contaminated materials. Properties within the project footprint were investigated for their potential to contain hazardous or contaminated materials. Thirty-eight parcels outside ConnDOT right-of-way were identified within the project footprint. These parcels were evaluated based on the database search results, site reconnaissance windshield survey results, a review of land uses, and staff file research. Five properties (seven parcels) are within the project footprint and have a high level of risk. A summary of the evaluation of risk and recommended further action for the parcels identified within the project footprint are presented in the complete final report.

During the design phase, further investigation would be conducted to determine actual levels of contamination at appropriate sites. All applicable state and federal regulations would be followed to address proper handling and disposal of any contaminated materials. Excavation would be minimized to the extent feasible, contaminated areas would be avoided where possible, and ConnDOT Environmental Compliance standards would be followed. Mitigation measures could include avoidance of contaminated areas, removal of contaminated materials, and remediation.

The No-Build Alternative would not create any impacts to Hazardous Material Sites.

ES 4.9 Other Environmental Issues

Within the study area, the following environmental issues were reviewed. The roadway modifications would be expected to have minimal impact on:

- Ground Water Resources
- Threatened and Endangered Species
- Farmlands
- Cultural Resources
- Socioeconomic and Environmental Justice Concerns

These environmental issues are discussed in greater detail in Chapter 4 of the complete final report.

ES 5.0 Capital Costs

A preliminary engineering estimate was prepared for the Build Alternative. The five kilometer (3.1 mile) long corridor was broken into two separate segments, segments A and B. Segment A, 3.7 kilometers (2.3 miles), is focused of the Flatbush Avenue interchange. Segment B, 1.3 kilometers (0.8 miles), is focused on the Sisson Avenue interchange. Table ES 5-1 summarizes the capital costs associated with the changes.

Table 5.1-1
Estimated Capital Costs Associated with the West Side Access Project, Year 2001 Dollars

Item	Segment A: Flatbush	Segment B: Sisson	Total
Construction Costs	$100.5 million	$254.5 million	$355.0 million
Design Costs	$ 7.0 million	$ 18.0 million	$ 25.0 million
Right of Way Acquisition (estimated)	$ 2.0 million	$ 2.0 million	$ 4.0 million
Contingencies	$ 4.5 million	$ 11.5 million	$ 16.0 million
TOTALS	**$114.0 million**	**$286.0 million**	**$400.0 million**

ES 6.0 Public Involvement

The West Side Access Study has a strong and comprehensive public involvement program, continuing from the Hartford West Major Investment Study (MIS). In order to provide adequate opportunities for the public to be informed about this study, and to solicit public information, efforts employed have included Advisory Committee meetings, city/town meetings, neighborhood meetings, a toll-free hotline, newsletters, and a website. The role of the Advisory Committee is to provide input to the study to act as contact for government agencies, businesses, and neighborhoods, and to review and help steer the progress of the study.

Chapter 1
BACKGROUND AND STUDY PURPOSE

The purpose of this study is to determine the need and identify changes that could be made to improve the Prospect Avenue, Flatbush Avenue, Sisson Avenue, and Sigourney Street interchanges along Interstate 84 (I-84). In addition to operations along I-84, this study focuses on local key locations in the vicinity of the freeway in the towns of Hartford and West Hartford. Figure 1.3-1 illustrates the study area. Modifications include eliminating left hand on and off-ramps, and providing a full-access interchange at Flatbush Avenue. Additional travel lanes to increase the capacity of I-84 are not being considered for reasons described below. For the purpose of this study, a new exclusive bus rapid transit (BRT) facility, the New Britain-Hartford Busway (which is being developed through a separate project) is assumed to be fully operational by the year 2020. The busway is proposed to be located along an existing Amtrak rail right-of-way within the corridor.

The Connecticut Department of Transportation (ConnDOT), in cooperation with the Capitol Region Council of Governments (CRCOG) completed a Major Investment Study (MIS) in March 1999 that evaluated transportation alternatives in the I-84 corridor between Hartford and Farmington (Hartford West). The MIS evaluated a variety of Reasonable Alternatives Packages (RAPs) to address transportation needs in the Hartford West corridor. The Hartford West study area included portions of towns/cities of: Hartford, West Hartford, Newington, New Britain, and Farmington. RAPs were groups of actions or strategies including roadway improvements (new travel lanes in I-84 constructing High Occupancy Vehicle [HOV] lanes) and transit improvements (commuter rail, light rail, and busways). The MIS recommended a package of improvements that would benefit local communities, the region and the state as a whole. The MIS recommendations included:

- Construction of a busway from New Britain to Hartford;
- Reconstruction of Flatbush, Prospect, Sisson and Sigourney interchanges;
- Reconstruction of Routes 4, 6 and 9 interchanges;
- Improvements to local bus service;
- Support for arterial roadways;
- Transportation Demand Management; and,
- Land-use regulations to support transit oriented design.

Ultimately, a "hybrid" RAP was selected, which included a recommendation for further consideration and analysis of the reconstruction of the I-84 interchanges at Prospect Avenue, Flatbush Avenue, Sisson Avenue, and Sigourney Street (West Side Access Study), as a mobility enhancement improvement, the subject of this study. The hybrid RAP included the New Britain Hartford Busway, which is now being studied as a separate project. The New Britain-Hartford Busway project is in the final stages of completing the Final Environmental Impact Statement. The Draft Environmental Impact Statement was finished in March 2001.

Other components of the RAP include the reconstruction of Routes 4, 6 and 9 Interchanges on I-84, auxiliary lanes in West Hartford, improved bus services along I-84/Farmington Avenue, support for arterial highways, and Transportation Demand Management (TDM) strategies.

For the Westside Access study area, the MIS evaluation determined that it would not be reasonable to add additional travel lane capacity on I-84 because of the anticipated social and environmental impacts, expense, and public opposition associated with such an action.

1.1 Transportation Needs in Study Area

The Build Alternative developed for this West Side Access study would address the following needs:

1. Peak Hour Traffic Operations on I-84 and Parallel Arterials
2. I-84 Highway Connectivity
3. Access from the Farmington Valley to the Hartford Central Business District

In addition to these transportation needs, there are other equally pressing matters of significant localized concern, such as undesirable traffic volumes in neighborhoods abutting I-84 or busy arterials in the study area.

1.2 Peak Hour Traffic Operations on I-84 and Parallel Arterials

The suggested modifications would address peak hour traffic operations in the study area communities. Congestion on major roadways is chronic and recurring during the peak hour, particularly on I-84 and on parallel roadways. Future traffic volumes are expected to grow, and the peak period of congestion is expected to increase in duration.

CRCOG has identified the I-84 Hartford West corridor to be the most congested highway in the Capitol Region. The MIS indicated that by the year 2020, total demand for the I-84 could exceed 190,000 vehicles per day. In 1995, portions of the I-84 corridor operated at acceptable levels of service and speeds during the peak hour, while other portions, primarily east of Route 9, suffered from congestion. Levels of service and speeds are forecast to deteriorate markedly by the year 2020. The peak period of delay is forecast to lengthen in this scenario.

The MIS also showed that other arterial roadways in the area suffer from congestion today or are expected to experience congestion in the year 2020. In the morning peak hour, 36 percent of the arterial mileage is projected to be over capacity in 2020 and 48 percent of the mileage would be over capacity during the afternoon peak hour.

Future increases in employment are expected in downtown Hartford along with suburban population growth. At the same time, travel to other activity centers in outlying areas is forecast to increase as well. Both traditional and “reverse” commuters would put increased demands on the highway system.

1.3 I-84 Highway Connectivity

Some congestion results from indirect travel in the network caused by poor connectivity. Poor connectivity may be one of two types: lack of connectivity or poorly designed or substandard connection. An example of a lack of connectivity would be when interchanges serve only one direction of travel (e.g., Flatbush Avenue). Poorly designed connections would include left-hand entrance or exit ramps. In many cases this may induce lane changing or mixing of higher speed and slower speed traffic that disrupts flow and creates hazards resulting in severe accidents.

While the expressway network in the study area is considered "complete" according to current plans, many connections between arterials and between arterials and expressways are either absent, or are physically or functionally obsolete. In some cases improved ramp connections could provide more direct access to key areas of potential economic development. The construction of identified areas could better balance the locations of transportation capacity and the locations of transportation demand. Two of the existing I-84 interchanges could be modified to reduce or eliminate unsafe exiting or merging areas. They include:

- **Flatbush Avenue Interchange** – The reconstruction of the Flatbush Interchange could provide the missing access to/from the west and also provide a new connection to the Parkville industrial corridor.

- **Sisson Avenue Interchange** - The reconstruction of the Sisson Avenue interchange could provide improved access to the Hartford street network and reduce the overall size of the interchange.

1.4 Access from the Farmington Valley to the Hartford CBD

Future employment increases are expected in downtown Hartford along with suburban population growth, causing increased numbers of commuters to utilize the I-84 corridor as well as parallel arterials. At the same time, travel to other activity centers in outlying areas is forecast to increase as well. Both traditional and "reverse" commuters would put increased demands on the highway system.

Reconfiguration of the interchanges would provide improved access to the Hartford street network.

1.5 Other Issues of Localized Concern

Within the study area, I-84 traverses five Hartford neighborhoods: Asylum Hill, Behind the Rocks, Frog Hollow, Parkville and the West End. In addition, a small portion of the corridor is located within the Town of West Hartford. All of the Hartford neighborhoods and the two municipalities are represented on a Community Advisory Group and participated in the Technical Advisory Committee (TAC) for this study. The Hartford neighborhoods have all adopted the following general goals and general recommendations for the redesign and reconstruction of the highway in the study area, reprinted here verbatim:

- Overall reduction of the negative impact of the highway on the neighborhoods – in terms of related traffic congestion, excessive speed, noise, air pollution, and the amount of space that the highway occupies in the neighborhood. Visual impacts of the highway and the need for context-sensitive design must be addressed. The elimination of green space and restricted access to park land caused by the original construction of I-84 need to be mitigated.

- Relief from excessive peak-hour traffic congestion at key intersections impacted by the highway traffic, so that these intersections can be improved and made more attractive for pedestrian use and safety, and can function less as barriers in the neighborhoods. Proposed design solutions for one neighborhood might exacerbate problems in another neighborhood. Thus a coordinated approach with all neighborhoods is necessary.

- Elimination of barren and insecure spaces near and under the highway.

- Improvement of the areas where I-84 connects to the city streets through traffic calming and beautification measures, and infrastructure that supports the attractiveness and safety for pedestrians and bicyclists.

- Provision for all modes of transportation, particularly transit, bicycles and pedestrians.

1.6 Goals and Objectives for Corridor

Transportation Goals and Objectives were the cornerstone for evaluating alternative transportation improvements. To evaluate the potential for success of the strategies, the TAC members defined a set of Goals and Objectives. The following five goals were supported by a comprehensive set of specific objectives and related performance measures:

Modal Choices – The first goal was to increase the modal choices available for the movement of people and goods. The new Flatbush Avenue and Sisson Avenue Interchange reconfigurations would create opportunities for improved bicycle and pedestrian facilities. In conjunction with the interchange reconfigurations, a new multi-use trail would be provided in the study area.

Congestion Reduction – The second goal was to reduce the peak hour vehicular congestion. The Hartford West MIS process made it clear that increased capacity on I-84 would not be reasonable because of cost, environmental impacts and public opposition. The most practicable way to address this goal for I-84 would be to improve traffic operations, by addressing interchanges and weaving/merging areas. Reconfiguring the configuration of Flatbush Avenue and Sisson Avenue Interchanges and providing auxiliary lanes in selected areas would enable for better access and eliminate driver confusion when weaving and merging, resulting in better traffic flow.

Public Health and Safety – The third goal was to improve public safety associated with transportation. The roadway modifications being considered would address a number of safety concerns throughout the corridor. Replacing left hand on and off ramps at the Flatbush Avenue and Sisson Avenue interchanges with right-hand ramps is expected to substantially reduce the number of accidents at these locations. Provision of a full interchange at Bartholomew Street

(Flatbush Avenue) would eliminate confusion in the mind of drivers looking for an exit ramp to Flatbush Avenue from the west. A smoother alignment with more gradual curves along I-84 from the east through the Sisson Avenue interchange is anticipated to improve safety. Full inside and outside shoulders should reduce the occurrence of accidents. In addition to these freeway safety improvements, sidewalks and crosswalks would be added throughout the corridor where needed, as well as adequate street lighting.

Economic Development – The fourth goal was to increase opportunities for local and region-wide economic development by improving mobility. Providing a single-point interchange at Sisson Avenue would return substantial pieces of land to the City or local property owners, allowing for the opportunity of new economic development in the study area. In addition, access improvements noted earlier would provide benefits to local businesses, as patrons and deliveries can follow more direct routes.

Community Livability & Quality of Life – The fifth goal was to enhance the livability and quality of life for the corridor towns, neighborhoods and communities. Aesthetic values of the area would be improved through a substantial landscaping effort at the two reconfigured interchanges of Sisson Avenue and Flatbush Avenue. The goal of the Sisson Avenue Interchange reconfiguration is to reduce the overall size of the interchange, providing a more aesthetically pleasing view for the neighborhoods. Local neighborhoods would additionally benefit from reducing the impacts on air quality, safety and visual intrusion that increased traffic brings.

1.7 Study Area and Neighborhood Characteristics

The study area (Figure 1.3-1) includes five defined neighborhoods within the City of Hartford – Asylum Hill, Behind the Rocks, Frog Hollow, Parkville and West End – and the Elmwood neighborhood within the Town of West Hartford.

The roadway modifications identified as a result of the West Side Access study would improve access to educational institutions, both within and outside the West Side Access study area, such as Central Connecticut State University, University of Connecticut Medical Center, Hartford Public High School, and Trinity College. They would also reconnect the community with new roadways that span I-84 and connect neighborhoods that are now isolated from each other.

Chapter 2
ALTERNATIVES

Since the Hartford West MIS was begun, various alternatives have been developed for the I-84 corridor within the study area. Through the evolution of the MIS, the resolution for this portion of I-84 was that there would be no additional through lanes added, but concepts would be developed to improve overall operations, improve safety and provide improved access to the local neighborhoods. This study evaluates the Build Alternative against a baseline No-Build Alternative.

2.1 No-Build Alternative

The No-Build Alternative assumes that no actions are preformed within the study area other than projects that are currently programmed or routine maintenance and operation of the existing transportation system. While the No-Build Alternative does not address the purpose and intended outcome of this study, it is always considered to provide a baseline comparison of the effects of the study.

2.2 Transportation System Management/Transportation Demand Management (TSM/TDM) Alternative

The TSM/TDM Alternative includes a broad range of low-cost, localized improvements to improve traffic flow, increase safety, and reduce travel demand without major capital investment or construction. These easily implemented measures would only have a minor effect in addressing the purpose and need of the project. The TSM/TDM was evaluated previously as part of the Hartford West MIS.

2.3 Build Alternative

The study area encompasses the I-84 interchanges beginning at Prospect Street and ending at Sigourney Street. The majority of changes considered would occur at the Flatbush Avenue and Sisson Avenue Interchanges. The Build Alternative would reconfigure the Prospect Avenue, Flatbush Avenue, Sisson Avenue, and Sigourney Street interchanges along I-84. In addition to improving operations along I-84, this study investigates potential improvements to key locations in the vicinity of the freeway in the towns of Hartford and West Hartford.

This study evaluates the existing conditions and anticipated impacts in the study area, including existing land use and zoning, existing traffic volumes, traffic operations along freeway and major intersections, accident experience, existing and potential new pedestrian and bicycle routes, and existing bus routes. The study also evaluates social, economic and environmental impacts. Measures for mitigating impacts are also discussed.

The concept plan developed as a result of this investigation includes:

2.3.1 Prospect Avenue Interchange (Exit 44)

The Prospect Avenue Interchange is primarily located in the Town of West Hartford. During the early phases of alternatives screening, the Town of West Hartford indicated that they did not see a need to modify the access at this interchange as it served the purpose of their community. As such, the only modifications to this interchange relate to the need to accommodate changes at the Flatbush Avenue Interchange and are discussed below.

2.3.2 Flatbush Avenue Interchange (Exit 45)

The design of the original Flatbush Avenue Interchange was intended to provide full eastbound and westbound access to an expressway connecting I-84 to the Town of Newington. The proposed roadway was never built and the associated connections to I-84 to/from the west were also never built. The suggested modifications to the Flatbush Interchange would provide the missing access to/from the west and a new connection to the Parkville industrial corridor. The reconfigured Flatbush Interchange is illustrated in Figure 2.3-1.

The first major change in the interchange is the construction of what is referred to in this report as the Bartholomew Avenue Extension. This new local city street would begin at Flatbush Avenue at the existing terminus of the Flatbush Avenue Ramps. This two-way roadway would contain two lanes (one lane in each direction) with a center median. It would follow the existing ramp alignment, northward under the existing I-84 Eastbound structure, pass under a new I-84 Westbound overpass and then connect to Bartholomew Avenue at the existing Olive Street/Bartholomew Avenue intersection. A sample roadway cross-section is illustrated in Figure 2.3-2.

Providing access to this new roadway would require the existing Flatbush Avenue Ramps to be reconfigured and missing ramps to be added. In the eastbound direction, a new off-ramp to Bartholomew Avenue Extended would begin after the existing off-ramp to Prospect Street. This new ramp would traverse under the Prospect Street overpass, under a reconfigured Prospect Street on-ramp overpass, then over New Park Avenue, over the proposed busway and Amtrak railroad right-of-way, and then down to an at-grade intersection with Bartholomew Avenue Extended. The existing eastbound on-ramp from Flatbush Avenue would be replaced with a new shorter ramp beginning at the at-grade intersection of Bartholomew Extended with the eastbound off-ramp. The on ramp would climb up to merge into a right-side I-84 auxiliary lane that would be marked “exit-only” to the Sisson Avenue eastbound off-ramp.

In the westbound direction, traffic destined for the Flatbush Avenue interchange would follow the following path: An auxiliary right lane would serve merging and weaving traffic entering and exiting between the Sisson and Flatbush Avenue interchanges. A right-hand off-ramp to Bartholomew Avenue would then replace the left-hand off ramp to Flatbush Avenue that exists today. The off-ramp would drop down to an at-grade intersection with the new Bartholomew Avenue Extended roadway.

The new westbound on-ramp would begin at this at-grade intersection, rise up and over the Amtrak railroad and proposed busway, and merge with I-84 into an auxiliary lane that would exit at the Prospect Street westbound off-ramp.

To accomplish these interchange modifications, the mainline of I-84 westbound in the area of Bartholomew Avenue Extended would be shifted in order to construct the overpass. Figure 2.3-3 illustrates the conceptual roadway cross-section where the I-84 mainline would be reconstructed. It is anticipated that the Prospect Street Bridge would need to be reconstructed in order to accommodate the additional width required for the new Flatbush ramps. Additionally, Olive Street would be closed and the I-84 overpass over Olive Street would be removed.

This new interchange configuration would create opportunities for improved bicycle and pedestrian facilities. In conjunction with the interchange reconfiguration, a new multi-use pathway (Figure 2.3-1) could be provided to begin at Flatbush Avenue, travel parallel to Bartholomew Avenue Extended on the east side, connecting to the existing Bartholomew Avenue sidewalk north of I-84. The pathway would also split and travel parallel to the I-84 Eastbound on-ramp from Bartholomew then travel between I-84 mainline and Wellington Street to Hamilton Street where it could then connect to Pope Park. Additionally, there is a proposal by others to construct a multi-use trail on the east side of the Park River. In order to connect with this proposed trail and the New Britain – Hartford Busway station at Flatbush Avenue, sidewalks could be constructed on the north side of Flatbush Avenue both east and west of the Bartholomew Avenue Extended/Flatbush Avenue intersection.

It is anticipated that the reconfiguration of this interchange could include a substantial landscaping effort, that, if desired, could make this interchange a welcoming gateway to Hartford and the local neighborhoods.

While there would be some wetland impacts with the construction of the interchange reconfiguration, the removal of the existing I-84 Eastbound on-ramp would offer an opportunity to restore wetlands between the multi-use trail and the Park River. This could also provide a unique opportunity within the City of Hartford to create green space as well as potentially create areas for flood relief.

2.3.3 Sisson Avenue Interchange (Exit 46)

As with the Flatbush Avenue Interchange, the Sisson Avenue Interchange was originally developed to be part of a freeway to the north with local connections to Sisson Avenue. The freeway to the north was never built and is not anticipated. Therefore, the ramp structures that exist today are not required. Additionally, because the freeway was never built, traffic with destinations to the north must all funnel through the Sisson Avenue interchange at one point. The goal of this interchange reconfiguration was to reduce its overall size while providing improved access to the Hartford street network. The new interchange configuration is illustrated in Figure 2.3-4.

Mainline I-84 through the interchange area would be realigned to eliminate the existing reverse curve, which affects safety. Additionally, the cross-section of the mainline would be further

developed (Figure 2.3-3). The existing ramp structure would be removed and a new city street (Boulevard Extended) would connect Sisson Avenue with Laurel Street. This new roadway would then have a single-point interchange connection with I-84. The Boulevard Extended roadway is intended to be a four-lane roadway with a median. A typical cross-section is illustrated in Figure 2.3-5. Because of this new roadway, the configuration of the Hawthorn Street/Forest Street intersection would be reconfigured. This modification would connect Hawthorn Street up to the new Boulevard Extended at an at-grade signal-controlled intersection. Forest Street would be maintained as a one-way south-bound roadway with a connection to Hawthorn aligned such that only a left-turn onto Hawthorn would be permitted, to prevent impacts from cut-through traffic. Additional modifications would be required at the Laurel Street/Hawthorn and Laurel Street/Capitol Avenue intersections.

The new single-point interchange configuration would provide right-hand ramps from the mainline as well as provide adequate capacity at the Boulevard Extension and freeway ramp intersection. The existing freeway ramps, some of which are left-hand ramps, would all be removed. The new interchange would be more compact and at a lower level than the existing structures. While other interchange configurations were considered, the single-point configuration provided the best level of service and least amount of vehicle queuing.

This interchange reconfiguration would provide the opportunity to return substantial pieces of land to the City or local property owners. Additionally, there would be less structure and roadway to maintain than what is present today.

Pedestrian/bicycle facilities are also included in this plan. This would include providing sidewalks along all new roadways that would be City streets (Figure 2.3-4).

2.3.4 Sigourney Street Interchange (Exit 47)

No changes to the Sigourney Street Interchange are included in the Build Alternative for this study.

2.4 Other Alternatives Considered

Various interchange concepts were developed for the study area throughout the Hartford West MIS, as well as during the early investigations of this West Side Access Study. The MIS process rejected the construction of additional through travel lanes on I-84 but identified localized interchange improvements that warranted further study. In the early process of the West Side Access Study, the MIS alternative was refined and several other alternatives developed for screening. These alternatives were then reviewed with the Town of West Hartford and City of Hartford as well as the TAC and the local neighborhoods in Hartford.

As a result of this effort, the Town of West Hartford indicated that they did not support changes to the Prospect Street interchange, so new screening alternatives for the Prospect Street and Flatbush Avenue Interchanges were developed. The TAC, the City of Hartford and the local neighborhoods reviewed the various concepts. During this screening process, the alternative presented in this document was becoming the preferred concept for further development. After

some minor adjustments to the interchange configurations, again based on comments from the City of Hartford and the local neighborhoods, the Build Alternative concept in this document was developed.

Prior to the development of the Build Alternative, four interchange concepts were developed for the Sisson Interchange and four interchange concepts were developed for the Flatbush Interchange. Drawings of these early concepts have been included in the Appendix and are described below.

The first Sisson alternative considered was similar to the Build Alternative, except that it included a diamond interchange with two separate ramp termini rather than the single-point interchange. The second Sisson alternative would have contained eastbound I-84 ramps on Laurel Street with westbound I-84 ramps at the end of Boulevard Extended, thereby creating a split interchange. The third Sisson alternative was similar to the first alternative, in that it contained a diamond interchange, however the diamond would have been tighter and relocated slightly to serve alternative locations. The fourth Sisson alternative would have included a single-point interchange similar to the Build Alternative, but with Hawthorne Street connected to Capitol Avenue rather than intersecting Boulevard Extended.

All four of the Flatbush alternatives involved a new arterial, Bartholomew Avenue Extended, in place of the existing ramps, as is the case for the Build Alternative. The first Flatbush alternative considered would have utilized one-way frontage roads on either side of I-84 to bring eastbound exiting traffic and westbound entering traffic to the new Bartholomew Avenue Extended. Ramps similar to those in the Build Alternative would be constructed for eastbound entering traffic and westbound exiting traffic. This alternative would have required the closure of the Prospect Avenue ramps (Kane Street and Caya Street ramps) and a cul-de-sac on Caya Street. The second Flatbush alternative was similar to the first, except that Bartholomew Avenue Extended would be relocated to the east on an alternative alignment. The third Flatbush alternative had ramps further to the east, similar to the Build Alternative, allowing the Kane Street ramps to remain open. However, the Caya eastbound on-ramp would have remained closed. The fourth Flatbush alternative was similar to the first alternative, except that it used only one two-directional road in place of the two one-way frontage roads.

Chapter 3
TRAFFIC AND TRANSPORTATION EVALUATION

This chapter presents the existing transportation conditions and anticipated effects associated with the year 2020 Build and No-Build Alternatives in the study corridor. A comprehensive review of existing conditions in the West Side Access Study area was published in the Technical Memorandum #1 (November 2000). That document should be consulted for detailed information.

3.1 Safety Analysis

This section presents the existing conditions in the corridor as it relates to accidents and the associated effects the Build and No-Build Alternative would have on safety in the corridor.

3.1.1 Existing Safety Conditions

Accident records for I-84 from the most recently available three-year period, October 1996 to September 1999, were analyzed. The number of accidents for the corridor as a whole has been increasing each year since 1996. In fact, more accidents occurred in the first nine months of 1999 than in the entire year 1998. Part of the increase in the number of accidents can be related to the increase in traffic on the I-84 corridor. As development in the Hartford area increases, more people drive the corridor, and more accidents occur. However, the 38% increase between 1998 and 1999 in the number of accidents occurring per month indicates that the situation may be more than just an increase in traffic.

Accident Rates

The comparison of the accident rates to the state average accident rate for that type of roadway section is vital to understanding which segments of the I-84 corridor should be analyzed. Table 3.1-1 provides the accident rates on I-84 for the three-year period from October 1996 to September 1999.

The interchange at Asylum Street has the highest accident rate (2.94 acc/mvm), and it is substantially higher than the state average accident rate for an urban interchange (2.18 acc/mvm). The other interchange areas are lower than the state average accident rate. The accident rate along I-84 between the Flatbush Interchange and the Sisson Interchange is twice the state average accident rate for an urban interstate segment (1.54 acc/mvm versus 0.75 acc/mvm). Both of these areas are of concern due to the ramp configurations and difficult merges that exist in the areas. I-84 between the Trout Brook Connector and the Prospect Interchange also has an accident rate (1.53 acc/mvm) that is twice the state average accident rate for an urban interstate segment.

Table 3.1-1
I-84 Accident Rates (eastbound and westbound)

	Segment	Number of Accidents	Length of Segment	Average Daily Traffic*	Accident Rate**	State Average Accident Rate**
1	Trout Brook Connector to Prospect Ave Interchange	75	0.35 mi	127,900	**1.53**	0.75
2	Prospect Ave Interchange (Exit 44)	223	-	136,900	1.49	2.18
3	Prospect Ave Interchange to Flatbush Ave Interchange	7	0.14 mi	125,500	0.36	0.75
4	Flatbush Ave Interchange (Exit 45)	106	-	143,600	0.67	2.18
5	Flatbush Ave Interchange to Sisson Ave Interchange	51	0.21 mi	143,600	**1.54**	0.75
6	Sisson Ave Interchange (Exit 46)	317	-	165,900	1.75	2.18
7	Sigourney St Interchange (Exit 47)	200	-	175,200	1.04	2.18
8	Capitol, Broad and Asylum Streets Interchange (Exit 48)	653	-	203,100	**2.94**	2.18
	Total Corridor	1632				

* Interchange area ADTs include mainline and ramp volumes.

** Accident rates are in number of accidents per million vehicle miles (acc/mvm) for segments and in number of accidents per million entering vehicles for interchanges.

Source: Wilbur Smith Associates (WSA), based on ConnDOT Accident Records 10/96 – 9/99

Lighting

The light conditions under which accidents occurred (daylight, dark, dusk or dawn) were evaluated to determine if certain locations had a disproportionate number of accidents during non-daylight conditions. This condition could indicate a potential need for improved lighting.

I-84 between Prospect Street and Flatbush Avenue shows a large percentage of accidents occurring during dark conditions. Of seven accidents, four occur during dark conditions. However, with so few accidents on this segment, it is unclear if lighting is a statistically significant factor.

The percentage of accidents occurring during dawn or dusk conditions is greater than average on I-84 between Flatbush Avenue and Sisson Avenue Interchanges. Of these dusk accidents, 80% occur westbound. The timing of when streetlights turn on in this area should be evaluated to make sure that the lights are on during dawn and dusk. The interchange area around Sigourney Street had a higher than average percentage of nighttime accidents.

Pavement Surface Conditions

The pavement surface conditions upon which accidents occurred (dry, wet, snowy or icy) were evaluated. Both the interchange area of Flatbush Avenue and the interchange area of Sisson Avenue had a higher than average percentage of accidents occurring under snowy or icy conditions.

Accident Severity

Accident severity is important in identifying dangerous locations along a corridor. Table 3.1-2 and Figure 3.1-1 show the accident severity along I-84 for each of the segments in the study area. In addition, the pie charts on Figure 3.1-1 are sized according to the total number of accidents on each segment to give an idea of where along the corridor the most accidents are occurring.

Table 3.1-2
I-84 Accidents by Accident Severity (eastbound and westbound)

Segment		Total No.	Property Damage Only		Injury		Fatality	
			No.	%	No.	%	No.	%
1	Trout Brook Connector to Prospect Ave Interchange	75	62	83%	13	17%	0	0%
2	Prospect Ave Interchange (Exit 44)	223	166	74%	57	26%	0	0%
3	Prospect Ave Interchange to Flatbush Ave Interchange	7	4	57%	3	43%	0	0%
4	Flatbush Ave Interchange (Exit 45)	106	88	83%	18	17%	0	0%
5	Flatbush Ave Interchange to Sisson Ave Interchange	51	41	80%	9	18%	**1**	2%
6	Sisson Ave Interchange (Exit 46)	317	236	74%	81	26%	0	0%
7	Sigourney St Interchange (Exit 47)	200	127	64%	73	**36%**	0	0%
8	Capitol, Broad and Asylum Streets Interchange (Exit 48)	653	443	68%	209	32%	**1**	0%
	Total Corridor	1632	1167	72%	463	28%	2	0%

Source: Wilbur Smith Associates (WSA), based on ConnDOT Accident Records 10/96 – 9/99

The percentage of injury accidents for the corridor as a whole was 28%. Most segments along the corridor were close to this percentage. I-84 from the Prospect Avenue Interchange to the Flatbush Avenue Interchange had a particularly high percentage of injury accidents (43% injury). However, as mentioned previously, this segment has a relatively small number of total accidents (7) and the percentage is not statistically significant.

The Sigourney Street interchange had a higher than average percentage of injury accidents, (36%). This interchange has a difficult weave in the eastbound direction between the Sigourney Street on-ramp and the Capitol Avenue and Asylum Avenue off-ramps downstream.

Two fatal accidents occurred within the corridor between 1996 and 1999. The first fatality, occurring on June 10, 1999 at 8:31 p.m. between the Flatbush Avenue Interchange and the Sisson Avenue Interchange (mile 60.27), was a sideswipe same direction accident (also called an overtake). The accident occurred 0.3 miles east of the westbound off-ramp. This is the segment approaching the left-side off-ramp at Flatbush Avenue. Under dusk dry conditions, a westbound automobile struck another westbound automobile, while making an unsafe lane change. One person was killed.

The second fatality, occurring on August 10, 1998 at 1:06 a.m. near the Capitol, Broad and Asylum Interchange (mile 61.62), was a head-on collision accident. The accident occurred 75

feet west of where the eastbound on-ramp meets I-84. Under dark dry conditions, a westbound automobile entered the highway in the wrong direction and struck two eastbound automobiles. The driver was under the influence of alcohol or drugs. One person was killed and three were injured.

Accident Type

Another method for determining the need for improvements to a high accident location is by analyzing the occurrence of various accident types. Table 3.1-3 and Figure 3.1-2 show the percentage of accidents by accident type for I-84.

Table 3.1-3
I-84 Accidents by Accident Type (eastbound and westbound)

	Segment	Total	Rear End		Overtake / Sideswipe		Fixed Object		Turning / Right Angle		Pedestrian / Bicycle		Run Off The Road		Head On		Other	
1	Trout Brook to Prospect	75	49	**65%**	13	17%	7	9%									6	8%
2	Prospect Ave (Exit 44)	223	124	56%	54	24%	22	10%	8	4%	1	0%	2	1%			12	5%
3	Prospect to Flatbush	7	6	**86%**			1	14%										
4	Flatbush Ave (Exit 45)	106	37	35%	28	26%	27	**26%**	1	1%			1	1%			12	11%
5	Flatbush to Sisson	51	18	35%	17	**33%**	11	22%									5	10%
6	Sisson Ave (Exit 46)	317	140	44%	86	27%	72	23%					1	0%			18	6%
7	Sigourney St (Exit 47)	200	79	40%	55	27%	33	17%	23	**11%**	2	1%					8	4%
8	Asylum St (Exit 48)	653	329	50%	153	24%	102	16%	46	7%	1	0%	1	0%	2	0%	19	3%
	Total Corridor	1632	782	48%	406	25%	275	17%	78	5%	4	0%	5	0%	2	0%	80	5%

Source: Wilbur Smith Associates (WSA), based on ConnDOT Accident Records 10/96 - 9/99

The category "Other" includes backing, moving object, jack-knife, overturn and unknown accident categories. Fixed object collisions are cars that hit the guide rails, jersey barrier or other object on the side of the road. As the table and figure show:

- The corridor's two western most segments, Trout Brook to Prospect Avenue and Prospect to Flatbush Avenue, had a higher than average number of rear end accidents. The congestion in the corridor as a whole and in this area in particular may contribute to the high number of rear end accidents, with vehicles stopping or slowing.

- The I-84 interchange with Flatbush Avenue had a higher than average number of fixed object accidents.

- The Flatbush Avenue to Sisson Avenue segment had a higher than average percentage of overtake/sideswipe accidents.

The Sigourney Street Interchange had a higher than average percentage of turning and right-angle accidents. These types of accidents occur on the ramp rather than along the freeway itself. Most of these accidents were left-turning accidents, many occurred at night (78%) and more than average were on wet pavement (40%).

Truck Related Accidents

In addition to these measures of accident analysis, the percentage of trucks involved in accidents can be a good measure of interaction problems between commercial vehicles and passenger cars along the corridor.

The percentage of vehicles on I-84 in the study area involved in an accident that were commercial vehicles is 14% for the corridor as a whole. This is higher than the percentage of trucks (approximately 5%) traveling in the corridor. Of the accidents in the study area in which trucks are involved, 23% involve an injury, 29% are at night, 15% occur on wet roads and 5% occur on snowy or icy roads. Since these percentages approximately equal corridor averages, truck accidents are similar to other accidents in the corridor involving all vehicles. However, a greater percentage of truck accidents are of the overtake type.

Contributing Factors

The top four typical contributing factors or causes of accidents included:

- Driver following too close (40%)
- Driver changed lanes improperly (21%)
- Driving too fast for conditions (14%)
- Driver unable to cope with conditions and lost control (9%)

Other factors such as foreign object in road, failure to grant right-of-way, disobeying a traffic signal, driver under the influence of alcohol or drugs, or slippery conditions each contributed to less than 5% of the accidents.

Time of Day and Day of Week

A disproportionate percentage of accidents occurred during the P.M. peak hours of 4:00 to 7:00 P.M. (32% average for corridor). I-84 between the Trout Brook Connector and Prospect Avenue had a higher than average percentage of accidents during the A.M. peak hours of 6:00 to 10:00 A.M. (27%). This is due to the higher congestion in the eastbound direction during this time. The Flatbush Interchange had a higher than average percentage of accidents (34%) in the midday period of 10:00 A.M. to 4:00 P.M. This may indicate that drivers unfamiliar with the area are having trouble at this interchange, as this is a time period not associated with normal commuter travel.

More accidents occurred on Fridays than on any other day (20%). This correlates to the travel patterns of the freeway users. Fridays have the highest volumes as well. Approximately 15% of

the accidents occurred during the day each Monday through Thursday, with 10% on each weekend day. One segment, Flatbush to Sisson had 20% of the accidents occurring on Sunday.

Direction of Travel and Ramp Accidents

For the corridor as a whole, accidents occurring in the eastbound direction made up 55% of the accidents, while accidents occurring in the westbound direction made up 40% of the accidents. The remaining accidents occurred in the northbound or southbound direction, which is possible because the data includes accidents that occurred on the ramps.

Although the corridor as a whole had more eastbound than westbound accidents, the interchange area of Flatbush Avenue had more westbound accidents (54%). A large number of these westbound accidents occur near the off-ramp in the afternoon peak period. This indicates that the left-side off-ramp may be a contributing factor for drivers when the traffic is heaviest. The accidents on the off-ramp are predominantly rear end and overtake type accidents.

Another area of concern is the left-exiting eastbound I-84 off-ramp at Sisson Avenue. Of the accidents occurring on this ramp, 41% are fixed-object accidents. In addition, a greater than average percentage of the accidents occur on a snowy or icy surface (26%) or on the weekend (38%). This indicates that many drivers that are unfamiliar with the road (weekend drivers may not use this ramp on a regular basis) or drivers traveling during adverse conditions may have trouble maneuvering the ramp.

Suggested List of Surveillance Study Sites

Five segments had accident rates high enough to be listed on ConnDOT's 1995-1997 Suggested List of Surveillance Study Sites (SLOSSS). The SLOSSS is a list of accident sites, for which improvements may be appropriate. Locations are listed on the SLOSSS when the accident rate is greater than average accident rates for similar facilities statewide and the location exceeds a minimum number of incidents. The segments of I-84 within the study area appearing on the SLOSSS include:

1. I-84 between Trout Brook Connector and Prospect Ave Interchange
2. I-84 between Flatbush Ave Interchange and Sisson Ave Interchange
3. I-84 at Sisson Ave Interchange (Exit 46)
4. I-84 at Sigourney St Interchange (Exit 47)
5. I-84 at Capitol, Broad and Asylum Interchange (Exit 48)

These locations are of particular concern when considering ways to reduce the number of accidents along the corridor. Two of the segments listed on the SLOSSS have no apparent characteristics that cause accidents. These include I-84 between Trout Brook Connector and Prospect Ave Interchange, and I-84 at Capitol, Broad and Asylum Interchange (Exit 48). The congestion in the corridor as a whole contributes to the high number of accidents, with vehicles stopping or slowing unexpectedly.

Several other segments have notable needs for geometric improvements:

- **I-84 at Flatbush Avenue Interchange (Exit 45)** – This location exhibits a higher than average percentage of accidents under snowy or icy conditions and a higher than average percentage of westbound accidents. The left-side westbound off-ramp may pose problems for drivers during heaviest traffic and under adverse weather conditions.

- **I-84 between Flatbush Avenue and Sisson Ave Interchange** -A fatality was recorded and a large percentage of accidents occur under dawn or dusk conditions, mostly in the westbound direction. The lighting should be checked for timing with the sunset. In addition, this area has a weave eastbound between the Flatbush on-ramp and the Sisson Avenue off-ramp and westbound between the Sisson Avenue on-ramp and the Flatbush Avenue off-ramp. The high dusk accidents may indicate the difficulty of making this weave under less than optimal conditions.

- **I-84 at the Sisson Ave Interchange (Exit 46)** – This location has a higher than average percentage of accidents under snowy or icy conditions, a higher than average percentage of accidents on the weekend, and a left-side off-ramp in the eastbound direction with many fixed object accidents. Drivers who are unfamiliar with the road or drivers traveling during adverse conditions may have trouble maneuvering the ramp.

- **I-84 at Sigourney St Interchange (Exit 47)** – This location has a higher than average percentage of nighttime accidents and higher than average percentage of injury accidents. It contains a difficult weave in the eastbound direction between the Sigourney Street on-ramp and the Capitol Avenue and Asylum Avenue off-ramps downstream.

3.1.2 Influence of Build/No-Build Alternatives-Safety

The roadway modifications being considered would address a number of safety concerns throughout the corridor. The following is a list of the expected safety benefits:

- Elimination of left-hand on- and off-ramps at Flatbush Avenue and Sisson Avenue Interchanges. These modifications are expected to significantly reduce the number of accidents at these locations with the provision of right hand entrance and exit ramps.

- Provision of a full interchange at Bartholomew Street (Flatbush Avenue) would eliminate confusion in the mind of drivers looking for an exit ramp to Flatbush Avenue from the west.

- Provision of a smoother alignment with more gradual curves along I-84 from the east through the Sisson Avenue Interchange would eliminate a number of driver maneuver concerns.

- Provision of an additional auxiliary lane in each direction and full inside and outside shoulders should reduce the occurrence of accidents along I-84 between Flatbush Avenue and Sisson Avenue and between Sisson Avenue and Sigourney Street. The auxiliary lane would allow vehicle maneuvers to take place outside of the three mainline travel lanes.

Shoulders would give vehicles a storage area out of the stream of traffic in the event of an emergency.

The No-Build Alternative would not address any deficiencies of the existing roadway system.

3.2 Travel Speed Analysis

This section presents the analysis of the existing travel speeds and the associated effects the Build and No-Build Alternatives (year 2020) would have on the travel speeds in the corridor.

3.2.1 Existing Travel Speeds

Average travel speed is a reliable indicator of roadway congestion. The study team preformed speed and delay runs on I-84 and other arterials within the study area. The average speeds are summarized in Table 3.2-1 and on Figures 3.2-1, 3.2-2, and 3.2-3. The A.M. peak hour is 7:30 A.M. to 8:30 A.M. and the P.M. peak is from 4:30 P.M. to 5:30 P.M. Midday speeds, which provide an "off-peak" comparison, were taken from 1:00 P.M. to 2:00 P.M.

Table 3.2-1
I-84 Speed Run Summary

Segment	Direction	Posted Speed	Average Travel Speed (mph)		
			AM	PM	Midday
I-84 West of Exit 44	WB	65	56	50	62
	EB	65	30	64	63
I-84 Exit 44 to Exit 45	WB	65	62	33	62
	EB	65	29	53	59
I-84 Exit 45 to Exit 46	WB	55	59	24	56
	EB	55	32	13	59
I-84 Exit 46 to Exit 47	WB	50	57	36	55
	EB	50	37	10	55
I-84 Exit 47 to Exit 48	WB	50	45	45	57
	EB	50	44	10	49

Source: WSA Travel Time Runs

Traffic on I-84 entering downtown Hartford during the A.M. peak hour is traveling at a speed between 25 and 35 miles per hour east of Exit 45 due to the merge/diverge and weaving activity. In the westbound direction, traffic is traveling in an off-peak direction and therefore the speeds are in the range of 55 to 65 miles per hour.

During the P.M. peak hour, east of Exit 45, traffic on I-84 is traveling at speeds lower than 20 miles per hour in the eastbound direction. This is due to ramp traffic from different areas in downtown Hartford heading east on I-84. This characteristic is also seen in the westbound direction, where the speeds range from 24 to 45 miles per hour during the evening peak hour condition.

During the midday peak hour, the traffic speed approaches free-flow speeds. Speeds in the eastbound and westbound directions are typically in the 55 to 65 miles per hour range.

3.2.2 Influence of Build/No-Build Alternatives – Travel Speeds

The suggested modifications would address travel speed deficiencies through the corridor by eliminating left lane on-and off-ramps at Flatbush Avenue and Sisson Avenue Interchanges. These changes would reduce the lane changing activity along I-84 and therefore, improve travel speeds through the corridor.

The No-Build Alternative would not address deteriorating speeds over time.

3.3 Interstate 84 Traffic Volumes and Capacity

This section presents the existing peak hour traffic volumes along I-84 that were recorded for this study. Also included is an assessment of the influence the Build and No-Build Alternatives would have on the traffic volumes and capacity on the highway.

3.3.1 Existing Peak Hour Traffic

During the A.M. peak hour along I-84, the majority of the traffic is traveling into Hartford, and during the P.M. peak a similar percentage of traffic is traveling out of Hartford. The A.M. peak hour is typically between 7:30 A.M. to 8:30 A.M. while the P.M. peak hour is typically between 4:30 P.M. to 5:30 P.M. Figure 3.3-1 illustrates the weekday A.M. and P.M. peak volumes for existing year (2000) conditions.

During the A.M. peak hour, I-84 carries approximately 6,250 vehicles per hour in the eastbound direction and 4,250 vehicles per hour in the westbound direction west of Exit 44. During the P.M. peak hour, I-84 carries approximately 4,250 vehicles per hour in the eastbound direction and 6,250 vehicles per hour in the westbound direction west of Exit 44. During the A.M. peak hour, east of Exit 47, I-84 carries approximately 8,100 and 7,080 vehicles per hour in the eastbound and westbound directions respectively. During the P.M. peak hour, I-84 carries approximately 6,520 and 7,530 vehicles per hour in the eastbound and westbound directions respectively. I-84 in both the eastbound and westbound direction has mainly three lanes between Exit 44 and 48. However, east of Exit 46, due to the presence of auxiliary lanes, weaving operations are somewhat improved.

One of the high volume ramp locations on this section of I-84 is the Asylum Avenue off-ramp. This ramp, in the westbound direction during the morning peak hour, carries approximately 1,850 vehicles per hour. In the eastbound direction, the on-ramp from Broad Street during the evening peak hour carries approximately 1,730 vehicles per hour. Also, the eastbound Capitol Avenue off-ramp carries approximately 2,250 vehicles per hour during the weekday morning peak hour while the westbound on-ramp carries approximately 2,050 vehicles per hour during the evening peak. The westbound Sigourney Street off-ramp carries approximately 1,500 vehicles per hour during the morning peak hour while during the evening peak hour the eastbound on-ramp from Sigourney Street carries 1,650 vehicles per hour. In addition, the

eastbound on-ramp from Sisson Avenue during the morning peak hour carries approximately 1,300 vehicles per hour, while the westbound Sisson Avenue off ramp carries approximately 1,050 vehicles per hour during the evening peak hour.

3.3.2 Influence of Build/No-Build Alternatives – Traffic Volumes and Capacity

With the Build Alternative, there would be a shift in traffic flow patterns along the I-84 corridor in both the A.M. and P.M. peak hour conditions. Figure 3.3-2 illustrates the year 2020 A.M. No-Build and Build traffic volumes along I-84 between Exits 44 and Exits 48. Figure 3.3-3 illustrates the 2020 P.M. No-Build and Build traffic volumes along I-84.

Under the Build Alternative, I-84 would have a full interchange at Bartholomew Street (formerly Flatbush Avenue). The braided ramp in the eastbound direction along I-84 in the vicinity of Prospect Avenue interchange would provide direct access to Bartholomew Street from the west. Due to this connection, approximately 47% of the traffic exiting at Prospect Avenue (Caya Avenue) under the 2020 No-Build Alternative would shift to the braided ramp connection to the Flatbush Avenue interchange under the 2020 Build Alternative.

In the westbound direction, during the A.M. peak hour, approximately 36% of the traffic entering I-84 from the Prospect Avenue (Kane Street) on-ramp under the 2020 No-Build Alternative would shift to the new on-ramp at the Bartholomew (Flatbush Avenue) interchange under the 2020 Build Alternative. During the P.M. peak hour, this shift under the 2020 Build Alternative is 50%. The on-ramp volume at the Bartholomew (Flatbush Avenue) interchange in the eastbound direction does not change during the A.M. peak hour period from the 2020 No-Build to the Build Alternative, but during the P.M. peak hour period it is projected to increase approximately 15%. The off-ramp volume at the Bartholomew (Flatbush Avenue) interchange in the westbound direction would not change in either the A.M. or P.M. peak hour period.

The new Boulevard Extended (Sisson Avenue) interchange, which would be configured as a Single Point Urban Interchange (SPUI), would consist of right-lane on-and off-ramps. The connection to Hawthorn Street and Laurel Street is anticipated to alleviate some traffic demand from the Sigourney Street interchange. During the A.M. peak hour period, in the westbound direction, approximately 13% of the traffic exiting at the Sigourney Street interchange under the 2020 No-Build Alternative shifts to the new Boulevard Extended (Sisson Avenue) interchange under 2020 Build Alternative. In the eastbound direction, due to the new connection at Laurel Street, approximately 2% of the traffic exiting at the Capitol Avenue/Asylum Street (Exit 48) under the 2020 No-Build Alternative would shift to the new Boulevard Extended (Sisson Avenue) interchange under the 2020 Build Alternative. During the P.M. peak hour period, in the westbound direction, approximately 4% of the traffic exiting at Flatbush Avenue under the 2020 No-Build Alternative would shift to the new Boulevard Extended interchange under the 2020 Build Alternative. In the eastbound direction, approximately 11% of the traffic entering I-84 from Sigourney Street under the 2020 No-Build Alternative would shift to the new Boulevard Extended interchange under the 2020 Build Alternative.

No additional capacity would be provided along the I-84 mainline in either the eastbound or westbound direction. However, between Exit 44 (Kane Street) and Exit 45 (Flatbush Avenue), an auxiliary lane would be provided in the westbound direction that would improve the weaving operations between these exits. Similarly, an auxiliary lane would be provided in the eastbound and westbound directions along I-84 between Exit 45 Bartholomew (Flatbush Avenue) and Exit 46 West Boulevard (Sisson Avenue) to improve weaving operations.

It is important to note that in the Build Alternative, auxiliary lanes are being added so that substandard weaving conditions are addressed. No through-capacity would be added in the corridor. Therefore, there would still be capacity constraints upstream and downstream of the sections containing auxiliary lanes.

Freeway Capacity Analyses

A study of capacity is important in determining the ability of a specific roadway, intersection, or freeway to accommodate traffic under various levels of service. Level of service (LOS) is a qualitative measure describing driver satisfaction with a number of factors that influence the degree of traffic congestion. These factors include speed and travel time, traffic interruption, freedom of maneuverability, safety, driving comfort and convenience, and delay.

There are six levels of service describing flow conditions. The highest, Level of Service A, describes a condition of free flow, with low volumes and high speeds. Level of Service B represents a stable traffic flow with operating speeds beginning to be restricted somewhat by traffic conditions. Level of Service C, which is normally utilized for design purposes, describes a stable condition of traffic operation. It entails moderately restricted movements due to higher traffic volumes, but traffic conditions are not objectionable to motorists. Level of Service D reflects a condition of more restrictive movements for motorists and influence of congestion becomes more noticeable. Level of Service E is representative of the actual capacity of the roadway or intersection and involves delay to all motorists due to congestion. The lowest, Level of Service F, is described as forced flow and is characterized by volumes greater than the theoretical roadway capacity. In extreme cases, the volume passing a given point drops to zero. This is considered an unacceptable traffic operating condition.

For this study, levels of service were determined for mainline freeway segments, freeway ramp junctions, freeway weaving conditions, and signalized and un-signalized intersections. Traffic analyses for this study was based on the 1997 Highway Capacity Manual and conducted using the Highway Capacity Software (HCS). It is important to note that based on the Highway Capacity Manual, the level of service results differ for a freeway section when compared to a signalized intersection. The following paragraphs define the LOS criteria for the various type of sections analyzed as part of this study.

Table 3.3-1 highlights the LOS criteria for freeway sections. The level of service criteria for freeway sections is based on maximum density defined in terms of passenger cars per mile per lane (pc/mi/lane).

Table 3.3-1
LOS Criteria for Freeway Sections

Level of Service	Maximum Density (pc/mi/lane)
A	10
B	16
C	24
D	32
E	45
F	Greater than 45

Source: 1997 Highway Capacity Manual, Transportation Research Board

Table 3.3-2 highlights the LOS criteria for freeway-ramp junctions. The level of service criteria for freeway-ramp junctions is based on maximum density defined in terms of passenger cars per mile per lane.

Table 3.3-2
LOS Criteria for Freeway-Ramp Junctions

Level of Service	Maximum Density (pc/mi/lane)
A	10
B	20
C	28
D	35
E	Greater than 35

Source: 1997 Highway Capacity Manual, Transportation Research Board

Table 3.3-3 highlights the LOS criteria for freeway weaving sections. The level of service criteria for freeway weaving sections is based on maximum density defined in terms of passenger cars per mile per lane.

Table 3.3-3
LOS Criteria for Weaving Areas

Level of Service	Maximum Density (pc/mi/lane)
A	10
B	20
C	28
D	35
E	Less than or equal to 43
F	Greater than 43

Source: 1997 Highway Capacity Manual, Transportation Research Board

Table 3.3-4 presents the results of the freeway analysis during the A.M. and P.M. peak periods under existing, 2020 No-Build, and 2020 Build conditions.

Table 3.3-4
Freeway Analysis Summary

Section Along I-84	Eastbound LOS, AM (PM)			Westbound LOS, AM (PM)		
	Existing	2020 No-Build	2020 Build	Existing	2020 No-Build	2020 Build
West of Exit 44	**F**(D)	**F**(D)	**F**(D)	D(**F**)	E(**F**)	E(**F**)
Between Exit 44 and Exit 45	**F**(D)	E(D)	E(D)	D(**F**)	E(E)	D(E)
Between Exit 45 and Exit 46	**F**(E)	**F**(D)	E(D)	E(**F**)	E(**F**)	D(E)
Between Exit 46 and Exit 47	**F**(D)	**F**(D)	**F**(D)	E(E)	E(E)	E(E)
Between Exit 47 and Exit 48	E(D)	E(D)	E(D)	E(D)	E(E)	E(E)

Source: WSA

I-84 currently is at capacity throughout the study area as well as immediately east and west of the study area. Therefore, under the future (2020) No-Build condition, it is anticipated that mainline traffic volumes along I-84 would not increase because of capacity limits. It is anticipated that traffic would divert to local arterials along I-84 as a result of congested mainline conditions. Therefore, due to regional growth and diversion of traffic to local arterials, ramp volumes are anticipated to increase under the future (2020) No-Build conditions. As a result of these ramp increases and capacity limits on I-84, certain segments of I-84 are anticipated to slightly decrease in traffic under the 2020 No-Build condition compared to existing conditions. Table 3.3-4 shows this phenomenon for the Levels of Service on I-84 in the eastbound direction for both AM and PM periods between Exit 44 and Exit 45 for existing and 2020 No-Build volumes. A similar "improvement" in LOS is seen westbound for AM and PM periods for existing and 2020 No-Build.

It is important to note that during the A.M. peak hour condition, eastbound is the peak direction, while, during the P.M. peak hour condition westbound is the peak direction of traffic flow. As shown in the table, in the eastbound direction, during the A.M. peak hour, the segment west of Exit 44 operates at LOS F under the 2020 Build condition. During the P.M. peak hour, the same segment exhibits a LOS F in the westbound direction under the 2020 Build condition. The segment west of Exit 44 consists of three lanes in the each direction and does not have sufficient capacity to handle the traffic volumes experienced during the peak hours of traffic flow in the peak direction. The segment between Exits 46 and 47 consists of four lanes in each direction with the inclusion of an auxiliary lane, but operates at a LOS F in the eastbound direction during the A.M. peak hour period.

As shown in Table 3.3-5, all freeway-ramp junctions operate at LOS F during the A.M. peak hour in the eastbound direction. However, during the P.M. peak hour in the westbound direction off ramp to Prospect Avenue (Kane Street) operates at LOS D and the remaining freeway ramp junctions operate at LOS F under the 2020 No-Build Alternative. Under the Build Alternative, auxiliary lanes would be provided to alleviate congestion along I-84 between Flatbush Avenue and Sisson Avenue interchanges in both directions and between the Flatbush Avenue and Kane

Street interchange in the westbound direction. These sections with auxiliary lanes were analyzed as weaving sections and will be discussed later in this section.

Table 3.3-5
Freeway Ramp Analysis Summary

Section Along I-84	Eastbound AM (PM)			Westbound AM (PM)		
	Existing	2020 No-Build	2020 Build	Existing	2020 No-Build	2020 Build
Exit 44						
Off Ramp to Kane St./Caya Ave.	**F**(C)	**F**(C)	**F**(C)	C(**F**)	D(D)	Aux. [1]
On Ramp from Kane St./Caya Ave.	**F**(C)	**F**(C)	**F**(C)	C(**F**)	D(**F**)	D(**F**)
Exit 45						
Off Ramp to Flatbush Ave/Frontage Rd..	-	-	**F**(C)	C(**F**)	D(**F**)	Aux.
On Ramp from Flatbush Ave.	**F**(C)	**F**(C)	Aux.	-	-	Aux.
Exit 46						
Off Ramp to Sisson Ave.	**F**(C)	**F**(C)	Aux.	Aux.	Aux.	Aux.
On Ramp from Sisson Ave.	Aux.	Aux.	Aux.	D(**F**)	D(**F**)	Aux.

Source: WSA Analysis
Note: [1] Aux. – Auxiliary Lane requires Weaving Analysis.

The Build Alternative does not provide additional capacity along I-84; therefore the freeway-ramp junctions would continue to operate at LOS F in the peak direction of traffic flow. However, certain sections of the highway mainline would improve in levels of service with the presence of auxiliary lanes.

Table 3.3-6
Weaving Analysis Summary

Section Along I-84	A.M. Peak			P.M. Peak		
	Existing	2020 No-Build	2020 Build	Existing	2020 No-Build	2020 Build
Eastbound Direction						
Flatbush Ave. to Sisson Ave.	**F**	**F**	**F**	**F**	**F**	D
Westbound Direction						
Sisson Ave. to Flatbush Ave.	**F**	**F**	E	**F**	**F**	**F**
Flatbush Ave. to Kane Street	-	-	D	-	-	E

Source: WSA Analysis

As indicated in Table 3.3-6, the Flatbush Avenue to Sisson Avenue section operates at LOS E or better in the off-peak direction with the roadway modifications. This is mainly due to the addition of auxiliary lanes and the elimination of left hand off ramps in this section of the highway. However, during the peak hour of traffic flow, the Flatbush Avenue to Sisson Avenue section continues to operate at LOS F under the Build condition.

The section of I-84 in the westbound direction between Flatbush Avenue and Kane Street would operate at LOS E or better during the A.M. and P.M. peak hour periods.

The No-Build Alternative would not improve Levels of Service.

3.4 Geometric Conditions

This section presents the existing geometric conditions observed along the highway in terms of acceleration and deceleration distances, and interchange spacing. The later part of this section discusses the Build and No-Build Alternatives as they relate to geometric conditions.

3.4.1 Existing Geometric Conditions

Due to presence of closely spaced interchanges and the addition of auxiliary lanes along I-84, an assessment was made of acceleration and deceleration distances and interchange spacing. Currently, I-84 carries approximately 180,000 vehicles per day in the Hartford downtown area within a varying cross-section that primarily contains three mainline lanes. With a number of merge-diverge and weaving sections in a short distance, the spacing of exits and the acceleration and deceleration distances become critical.

Acceleration and Deceleration Distances

Tables 3.4-1 and 3.4-2 illustrate the results of the on and off ramp assessment for the 12 ramps in the study area. The purpose of this analysis is to determine if the acceleration and deceleration distances meet American Association of State Highway and Transportation Officials (AASHTO) guidelines. The values shown in bold text do not meet AASHTO guidelines.

Table 3.4-1
On Ramp Assessment

Location	Acceleration Length		AASHTO Minimum Acceleration Length	
	(m)	(ft)	(m)	(ft)
Exit 44				
Eastbound	**145**	**480**	290	950
Westbound	**120**	**400**	445	1460
Exit 45				
Eastbound	**205**	**680**	245	805
Exit 46				
Eastbound	925	3050	365	1200
Westbound	**185**	**600**	315	1035
Exit 47				
Eastbound	435	1425	245	805

Based on the analysis, four on-ramps are geometrically deficient due to inadequate acceleration length provisions. Wherever there was a lane added at the on-ramp location, the existing acceleration distance could not be determined. It should be noted that for the on-ramps at Exit 46 and Exit 47, where an auxiliary lane is provided, the existing acceleration distances were determined by the length of the auxiliary lane.

Table 3.4-2
Off Ramp Assessment

Location	Deceleration Length		AASHTO Min. Deceleration Length		Signalized Intersection (Y/N)	Total Ramp Length	Estimated Queue Length
	(m)	(ft)	(m)	(ft)		(ft)	(ft)
Exit 44							
Eastbound	140	460	120	390	No		
Westbound	**90**	**300**	150	490	Yes	1310	180
Exit 45							
Eastbound	360	1190	120	390	Yes	6320	220
Exit 46							
Eastbound	305	1000	120	390	Yes	3780	1050
Westbound	Lane	Lane	120	390	Yes	4000	1050
	Drop	Drop					
Exit 47							
Eastbound	435	1425	120	390	Yes	1010	NC

NC=Not Calculated

The deceleration distances were determined from AASHTO guidelines for the off-ramp locations. Based on the analysis, three locations are geometrically deficient. Two locations are geometrically deficient with the existence of a queue at the ramp termini. The queue length at these locations could not be calculated due to poor level of service (LOS F) at these intersections. There are three locations where there was a lane drop along the freeway due to exit-only marked lanes.

Ramp Spacing Analysis

A ramp spacing analysis was also conducted along the I-84 study corridor to identify the interchange spacing deficiencies. Interchange spacing is the separation distance between ramps (on or off) in close succession that are either upstream or downstream on a freeway. Interchange spacing becomes a critical factor in urban settings like Hartford where there are a number of entrances and exits in close succession and many vehicle maneuvers take place.

Table 3.4-3 lists the results of the ramp spacing analysis.

Table 3.4-3
Ramp Spacing Analysis

Location	Downstream Ramp	AASHTO Ramp Designation	Downstream Distance to Next Ramp		AASHTO Min. Recommended Distance	
			(m)	(ft)	(m)	(ft)
Eastbound						
Exit 44 Off Ramp	Exit 44 On Ramp	Ex-En	580	1915	150	500
Exit 44 On Ramp	Exit 45 On Ramp	En-En	770	2525	300	1000
Exit 45 On Ramp	Exit 46 Off Ramp	En-Ex	975	3205	600	2000
Exit 46 Off Ramp	Exit 46 On Ramp	Ex-En	490	1615	150	500
Exit 46 On Ramp	Exit 47 On Ramp	En-En	490	1615	300	1000
Westbound						
Exit 47 Off Ramp	Exit 46 Off Ramp	Ex-Ex	555	1825	300	1000
Exit 46 Off Ramp	Exit 46 On Ramp	Ex-En	590	1930	150	500
Exit 46 On Ramp	Exit 45 Off Ramp	En-Ex	795	2610	600	2000
Exit 45 Off Ramp	Exit 44 Off Ramp	Ex-Ex	1020	3340	300	1000
Exit 44 Off Ramp	Exit 44 On Ramp	Ex-En	450	1470	150	500

3.4.2 Influence of Build/No-Build Alternatives – Geometric Conditions

With the Build Alternative, all AASHTO acceleration and deceleration distance requirements would be met in the eastbound and westbound directions. The presence of auxiliary lanes in the eastbound and westbound directions between Flatbush Avenue and Sisson Avenue and between Flatbush Avenue and Kane Street in the westbound direction would provide better acceleration and deceleration distances along I-84. The eastbound on-ramp from Prospect Avenue would be provided with an acceleration distance of 290 m (950 ft.) under the Build Alternative that satisfies the AASHTO requirements.

Under existing conditions, there are no ramp spacing deficiencies between interchanges between Exits 44 and 47 and the Build Alternative would not adversely impact any ramp spacing between interchanges.

The No-Build Alternative would not improve substandard geometrics.

3.5 Arterial Traffic Volumes

This section summarizes the existing peak hour traffic volumes along local arterials in the corridor. With the Build Alternative, new connections would be provided to the local street system that would force traffic to shift to new routes in the corridor and therefore, certain segments would experience an increase or decrease in traffic volumes. The anticipated changes in traffic volumes due to the Build and No-Build Alternatives are also presented.

3.5.1 Existing Arterial Traffic Volumes

Existing peak hour volumes along local arterials are shown in Figure 3.5-1**.**

- Farmington Avenue, an east-west street, carries approximately 1,080 vehicles per hour during the A.M. peak and approximately 1,445 vehicles per hour during the P.M. peak hour periods. During the A.M. peak hour, approximately 76% of the traffic on Farmington Avenue is headed towards downtown Hartford while during the P.M. peak hour approximately 58% of the traffic travels out of downtown Hartford into adjacent communities.

- Sisson Avenue is a major north-south street that provides access to and from the I-84 ramps at Exit 46. Sisson Avenue carries approximately 1,010 and 1,135 vehicles per hour during the A.M. and P.M. peak hour periods respectively.

- Capitol Avenue is a major east-west arterial that connects communities in West Hartford and Hartford to downtown Hartford. This street carries 1,110 and 1,760 vehicles per hour during the A.M. and P.M. peak hour periods respectively. Similarly, during the A.M. peak hour Capitol Avenue carries approximately 76% of traffic into downtown Hartford, while during the P.M. peak hour it carries approximately 74% of traffic out of downtown Hartford.

- Park Street is also a major east-west connector to downtown Hartford and carries approximately 940 and 1,240 vehicles per hour during the A.M. and P.M. peak hour periods respectively.

- Sigourney Street provides access to and from the I-84 ramps from the east at Exit 47 carries approximately 1,370 and 1,460 vehicles per hour during the A.M. and P.M. peak hour periods respectively.

3.5.2 Influence of Build/No-Build Alternatives – Arterial Traffic Volumes

Future year (2020) peak hour traffic volumes along local arterials are shown in Figures 3.5-2 and 3.5-3. Table 3.5-1 shows changes between the No-Build and Build Alternatives traffic volumes at key segments in the corridor.

Table 3.5-1
Changes in Segment Traffic Volumes

Location	No-Build		Build		Difference	
	AM	PM	AM	PM	AM	PM
Farmington Ave. west of Laurel Street	1690	1955	1055	1610	-635	-345
Sisson Ave. south of Farmington Avenue	1150	1270	725	935	-425	-335
Sisson Ave. south of W. Boulevard	1280	1810	1180	1500	-100	-310
Capitol Ave. east of Sisson Ave.	1595	2350	905	1545	-690	-805
Laurel Street south of Farmington Ave.	720	935	1255	1460	535	525
Laurel Street south of Hawthorn Street	875	1250	1115	1270	240	20
New Park Ave. south of Hamilton Street	885	1555	605	1155	-280	-400
New Park Ave. north of Flatbush Ave.	1425	2530	1170	2200	-255	-330

As shown in the table, Farmington Avenue between Sisson Avenue and Laurel Street indicates a decrease in traffic volume of approximately 40% and 20% during the A.M. and P.M. peak hour periods respectively from No-Build to Build. Similarly, Sisson Avenue between Farmington Avenue and Capitol Avenue indicates a decrease in traffic volume of approximately 35% and 25% during the A.M. and P.M. peak hour periods respectively under the Build Alternative. Capitol Avenue between Sisson Avenue and Laurel Street shows a decrease in traffic volume of approximately 40% during the A.M. and P.M. peak hour periods. Overall, there is a substantial benefit of reduced traffic volumes on Farmington Avenue, Sisson Avenue, and Capitol Avenues with the Build Alternative.

In the southern end of the study area, traffic volumes on New Park Avenue would decrease approximately 30% during the A.M. and P.M. peak hour periods from the No-Build to the Build Alternative.

Traffic volumes along Laurel Street would increase by as much as 70% during the A.M. peak hour period north of Hawthorn Street from the No-Build to the Build Alternative. This is primarily due to the connection between Boulevard Extended and Laurel Street via Hawthorn Street.

3.6 Intersection Analysis

This section describes the signalized and unsignalized intersection analyses under existing conditions in the study area. Later in this section, the anticipated influence of the Build Alternative and No-Build condition on signalized and unsignalized intersections is highlighted.

Tables 3.6-1 and 3.6-2 highlight the level of service criteria for signalized and un-signalized intersections. The level of service criteria for signalized and un-signalized intersections is based on control delay per vehicle measured in seconds.

Table 3.6-1
LOS Criteria for Signalized Intersections

Level of Service	Control Delay Per Vehicle (seconds)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	> 80

Source: 1997 Highway Capacity Manual, Transportation Research Board

Table 3.6-2
LOS Criteria for Un-signalized Intersections

Level of Service	Control Delay Per Vehicle (seconds)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

Source: 1997 Highway Capacity Manual, Transportation Research Board

3.6.1 Existing Conditions – Intersection Analysis

Signalized and unsignalized intersection analyses were performed at study area intersections during the weekday A.M. and P.M. peak hours under existing year conditions. This analysis indicates that arterials that serve downtown Hartford are heavily traveled during peak hour periods and experience traffic congestion due to heavy turn movements entering and exiting from side streets. In addition, streets that have direct access to and from I-84 ramps also show poor operations during peak commuter hours. The results of the LOS analysis for existing conditions are shown in Table 3.6-3 and Figures 3.6-1 through Figures 3.6- 4. LOS F is shown in bold text.

Table 3.6-3
Existing Conditions - Signalized Intersections

Intersection	Existing	
	AM	PM
Farmington Ave. and Broad Street	**F**	D
Farmington Ave. and Sigourney Street	C	B
Farmington Ave. and Laurel Street	B	D
Farmington Ave. and Sisson Ave./Sherman Avenue	**F**	D
Farmington Ave. and Prospect Ave.	C	C
Capitol Ave./Boulevard Ave. and Prospect Avenue	D	D
W. Boulevard Ave. and Prospect Avenue	C	E
W. Boulevard Ave. and Sisson Ave./I-84 Off Ramps	**F**	**F**
Hawthorn Street and Laurel Street	B	C
Sigourney Street and Hawthorn Street	B	D
Sigourney Street and I-84 WB Off Ramp (Exit 47)	**F**	**F**
Sigourney Street and I-84 EB On Ramp (Exit 47)	B	E
Capitol Ave. and Park Terrace	C	C
Capitol Ave. and Sisson Ave.	C	C
Capitol Ave. and Forest Street	B	C
Capitol Ave. and Laurel Street	C	**F**
Capitol Ave. and Park Place	A	B
Capitol Ave. and Flower Street	B	C
Capitol Ave. and Broad Street	D	**F**
Capitol Ave. and Hungerford Street	A	B
Capitol Ave. and Oak Street/I-84 Ramps	**F**	**F**
Park Street and New Park Ave./Sisson Ave.	C	D
Park Street and Laurel St./Pope Park Dr.	C	C
Park Street and Park Terrace	C	D
Kane Street and New Park Ave.	C	C
Kane Street and Oakwood Avenue	B	B
Prospect Avenue and Kane Street	B	C
Prospect Avenue and Park Road/Park Street	C	C
Prospect Avenue and New Park Avenue	A	B
Kane Street and Plaza/I-84 WB Ramps	C	C
Caya Avenue/I-84 EB On Ramp and Prospect Ave.	B	B
Flatbush Ave. and New Park Ave.	D	**F**
Flatbush Ave. and I-84 Ramps/Community Place	C	D
Flatbush Ave. and Brookfield Street	C	C
Grace Street/Hamilton St. and New Park Ave.	C	C
Hamilton Street and Bartholomew Ave.	B	B
Hamilton Street and Pope Park Drive	C	D

Source: WSA Existing Conditions Analysis

As indicated in the table, some intersections in the study area were identified to operate at poor levels of service (LOS F) under existing conditions due to one or more of the following reasons:

- Heavy traffic volumes;
- Improper signal timing; and/or
- Inadequate lane capacity at the intersection.

The intersection of Farmington Avenue and Sisson Avenue operates at LOS F during the A.M. peak hour period due to its proximity to the I-84 ramps. The intersection of West Boulevard Avenue, Sisson Avenue, and I-84 Ramps operates at LOS F during the A.M. and P.M. peak hour periods due to its connectivity to Aetna and businesses in the downtown Hartford area. The intersection of Sigourney Street and the I-84 WB Off-Ramp operates at LOS F during the A.M. and P.M. peak hour periods due to its proximity to downtown Hartford businesses. The intersection of Capitol Avenue and Laurel Street operates at LOS F during the P.M. peak hour Period due to heavy traffic volumes along Capitol Avenue in the westbound direction. Also, the intersection of Flatbush Avenue and New Park Avenue operates at LOS F during the P.M. peak hour period.

The results of the unsignalized intersection analyses are presented in Table 3.6-4.

Table 3.6-4
Existing Conditions – Unsignalized Intersections

Intersection	Existing	
	AM	PM
Hawthorn Street and Forest Street	B	B
Park Street and Bartholomew Avenue	C	E
Hamilton Street and Brookfield Street	C	**F**
Flatbush Avenue and Newfield Avenue	**F**	**F**
Caya Avenue and Oakwood Avenue	A	B
Caya Avenue and I-84 EB Off-Ramp	B	B

Source: WSA Existing Conditions Analysis

As indicated in the table, the intersection of Flatbush Avenue and Newfield Avenue operates at LOS F during the A.M. and P.M. peak hour conditions. Also, the intersection of Hamilton Street and Brookfield Street operates at LOS F during the P.M. peak hour condition. These intersections exhibit poor levels of service mainly due to the heavy traffic volumes along Hamilton Street and Flatbush Avenue.

3.6.2 Influence of Build/No-Build Alternatives - Intersections

All intersections in the study area were evaluated under the year 2020 No-Build and Build conditions. The signal timings were optimized under the No-Build and Build conditions to calculate the levels of service. Since the evaluation of impacts is focused in a relatively smaller area, the results of the signalized intersection analyses in Table 3.6-5 show key locations in the impact area.

Table 3.6-5
Future Year (2020) - Signalized Intersection Analyses

Intersection	A.M. Peak		P.M. Peak	
	No-Build	Build	No-Build	Build
Farmington Avenue and Sisson Avenue	**F**	D	E	D
Farmington Avenue and Laurel Street	C	D	D	E
Farmington Avenue and Sigourney Street	C	C	C	C
Hawthorn Street and Laurel Street	D	**F**/D[(1)]	E	**F**/D[(1)]
Sigourney St. and Hawthorn Street	B	B	D	D
Sigourney St. and I-84 WB Off Ramp	D	D	C	C
Sigourney St. and I-84 EB On Ramp	B	B	E	E
Capitol Avenue and Laurel Street	**F**	E/C[(1)]	**F**	**F**/C[(1)]
Capitol Avenue and Sisson Avenue	C	C	D	C
Sisson Avenue and W. Boulevard	**F**	D	**F**	E
W. Boulevard Ext. and Hawthorn St.	-	B	-	C
W. Boulevard Ext. and I-84 Ramps	-	C	-	C
W. Boulevard Ext. and Laurel St.	-	B	-	B
Hamilton Avenue and N. Park Avenue	C	B	E	D
Hamilton Avenue and Bartholomew Street	B	C	B	**F**
Hamilton Avenue and Hillside Avenue	D	D	E	E
Bartholomew Ext. and I-84 WB Ramps	-	C	-	C
Bartholomew Ext. and I-84 EB Ramps	-	B	-	C
Flatbush Avenue and Bartholomew St. Ext.	C	C	C	B
Flatbush Ave. and N. Park Avenue	D	C	**F**	**F**
Prospect Ave. and I-84 EB Ramps	C	B	C	B
Kane St. and I-84 WB Ramps	C	C	C	C

Source: WSA Analysis
(1) with roadway improvements

As indicated in the table, with the roadway modifications in place, the following intersections show an improvement in traffic operations between No-Build and Build Alternatives:

- Farmington Avenue and Sisson Avenue;
- Capitol Avenue and Sisson Avenue;
- Capitol Avenue and Laurel Street;
- Sisson Avenue and W. Boulevard Avenue;
- Hamilton Avenue and New Park Avenue; and,
- Flatbush Avenue and New Park Avenue.

The intersections that deteriorate in performance are:

- Farmington Avenue and Laurel Street;
- Hawthorn Street and Laurel Street; and,
- Hamilton Avenue and Bartholomew Street.

It is important to note that some intersections operate at LOS F even with the Build condition and would require additional turn lanes to improve levels of service. As part of the roadway modifications, the intersection of Capitol Avenue and Laurel Street would be widened to provide

additional capacity at the intersection to improve levels of service at this location. Widening would allow this intersection to operate at LOS C during both the A.M. and P.M. peak hour conditions.

The intersection of Hawthorn Street and Laurel Street would also be widened to provide additional capacity at the intersection to improve levels of service. Widening would allow this intersection to operate at LOS D during both the A.M. and P.M. peak hour conditions.

The unsignalized intersections would not have improved levels of service as a result of the Build Alternative. The intersection of Flatbush Avenue and Newfield Avenue would operate at LOS F as would the intersection of Hamilton Street and Brookfield Street. These two intersections warrant consideration of signalization with increases in traffic volumes and congestion along Flatbush Avenue and Hamilton Street.

The No-Build Alternative would not affect intersection operations.

3.7 Local Vehicle Circulation

The previous discussions have highlighted changes in traffic volumes in the study area due to the Build condition. This change is due to the increased access to I-84 as well as further improved connections between local streets. By attempting to connect local streets, there would be a greater opportunity to reconnect neighborhoods and provide motorists with alternative paths to get to their destinations. In addition, the completion of the Flatbush Interchange and its connection to Bartholomew would allow motorists to change their paths to shorter routes, therefore providing relief to many of the local streets in the area. The reconnection of the streets would also provide a means for other modes of transportation, particularly pedestrian and bicycle traffic, to use these facilities.

The No-Build Alternative would not improve local vehicle circulation.

3.8 Public Transit

The existing transportation services and facilities in the study area such as public transit services and bicycle routes were examined. Truck movements in the corridor, specifically in the vicinity of the freeway ramps, were also examined.

3.8.1 Existing Conditions

A variety of public transportation services in the study area serve mobility needs focused on the greater Hartford area. These services include:

- CT Transit
- New Britain Transportation
- Greater Hartford Transit District Paratransit
- Greater Hartford Ridesharing Corporation
- Bonanza Bus
- Downtown Circulator/Shuttle

FIXED ROUTE LOCAL TRANSIT AND EXPRESS BUS OPERATIONS

Connecticut Transit (CT Transit) is the principal public transit bus operator in the State of Connecticut. CT Transit is owned by the State and has operating divisions in Hartford, New Haven, and Stamford. The routes that serve the study area are shown in Figure 3.8-1. In the vicinity of the study area, CT Transit runs the following routes:

Route #A has two services: AA through Asylum Avenue and AH through Hillside Avenue. Route # A inbound to downtown begins at the Storrs Street Terminus travels through Hillside Avenue, Broad Street, Capitol Avenue and terminates at Main Street (Traveler's Building). Some routes continue to the CIGNA South Building. Typical frequencies during the morning peak hour into Hartford are 15 to 20 minutes while outbound from Hartford during the evening peak are the same. During Saturdays and Sundays, the buses operate at headways of one hour in both the inbound and outbound directions.

Route #E in the vicinity of the study area operates along Farmington Avenue. Most routes begin at the Farmington Center and travel through West Hartford along Farmington Avenue into downtown Hartford. During the morning peak hour, the bus frequency into Hartford is between 20 to 30 minutes while during the evening peak hour the frequency out of Hartford is 20 to 50 minutes. During Saturdays and Sundays, the buses operate at headways of one hour in both the inbound and outbound directions.

Route #F in the vicinity of the study area operates along Broad Street into the town of Wethersfield. This route travels along Broad Street in Hartford and intersects Park Street and Capitol Avenue before terminating in downtown Hartford. During the morning peak hour, the bus frequency into Hartford is between 15 to 20 minutes while during the evening peak hour the frequency out of Hartford is the same. During Saturdays, the buses operate at headways of typically 30 minutes in both the inbound and outbound directions. There is no Sunday service for this route.

Route #K in the vicinity of the study area operates along Park Street in the West Hartford and Hartford areas. Some routes begin at the West Farms Mall and some at B.J.'s/Home Depot along New Park Avenue. All routes have a downtown stop at the Old State House. Some routes terminate at that location, while others continue further into Windsor. The route that begins at the West Farms Mall travels through Park Street into downtown Hartford while the route beginning at B.J.'s/Home Depot travels along New Park Avenue, Park Street, and enters downtown Hartford. During the morning peak hour, the bus frequency into Hartford from West Farms Mall is at 30 minute headways while the service from B.J.'s/Home Depot is at 20 to 30 minute headways. During the evening peak hour the frequency out of Hartford is 20 to 40 minutes to B.J.'s/Home Depot and the West Farms Mall. During Saturdays, the buses operate at 30 minute headways in both the inbound and outbound directions along the B.J.'s/Home Depot and West Farms Mall routes. During Sundays, Route #K operates only along the B.J.'s/Home Depot route with a headway of one hour both into and out of downtown Hartford.

Route #Q in the vicinity of the study area travels along Flatbush Avenue into downtown Hartford. Some routes begin at the West Farms Mall while some begin at the B.J.'s/Home depot along New Park Avenue. The route that travels through Flatbush Avenue is the B.J.'s/Home Depot route. During the morning peak hour, this route has 20 to 40 minute headways into downtown Hartford while during the evening peak hour it has headways of 30 minutes out of Hartford. During Saturdays, the B.J.'s/Home Depot route has one hour headways in and out of downtown Hartford. During Sundays, no service is provided to the B.J.'s/Home Depot route.

Route #W in the vicinity of the study area travels along Capitol Avenue into downtown Hartford. Some routes begin at Oakwood Avenue (at B.J.'s/Home Depot) while some begin at the Veteran's Administration Hospital in Newington. The route that begins at the B.J.'s/Home Depot travels along Oakwood Avenue into Capitol Avenue and finally terminates in downtown Hartford. The route that begins at the Veteran's Administration Hospital travels through West Hartford into Capitol Avenue and finally terminates in downtown Hartford. During the morning peak hour, the Oakwood Avenue route has 15 to 25 minute headways into downtown Hartford, while during the evening peak hour it has headways of 30 to 40 minutes out of Hartford. During the morning peak hour, the Veteran's Administration Hospital route has 15 to 25 minute headways into Hartford while in the evening peak it has 30 to 35 minute headways out of Hartford. During Saturdays, buses arrive in downtown Hartford at one-hour headways and depart Hartford with the same headways.

New Britain Transportation provides local service on two express routes to downtown Hartford under contract with the Connecticut department of transportation. The Cheshire/Southington commuter express consists of two morning peak and evening peak trips in and out of Hartford respectively. This in the vicinity of the study area travels along I-84. The Bristol commuter express has typical headways of 15 minutes during the morning and the evening peak hours. This bus also travels along I-84 in the vicinity of the study area.

INTERCITY BUS CARRIERS

The Bonanza Bus Company operates 10 buses a day from Hartford to New York City and 10 buses a day from New York City to Hartford. The buses stop in Farmington, Waterbury, Southbury, Danbury and sometimes White Plains and Yonkers. Beyond the Hartford stop, four buses a day in each direction continue from Hartford to Manchester, Willimantic, Danielson and Providence. The service is provided every day of the week including Saturdays and Sundays. During the peak commuter hours, the buses arrive in Hartford during the morning peak hour at 8:45 a.m. and depart Hartford during the evening peak hour at 5:45 p.m.

GREATER HARTFORD TRANSIT DISTRICT

The Greater Hartford Transit District is a regional governmental unit consisting of 16 member towns including the study area communities of Hartford and West Hartford. In addition to its planning and regulatory activities, GHTD is a local transportation provider that operates a downtown shuttle in the Hartford known as the "Scooter", and operates the Greater Hartford area paratransit service.

Paratransit service in the Greater Hartford area includes services as mandated by the Americans with Disabilities Act (ADA) as well as dial-a-ride taxi and van service available to a broader population of senior citizens. The ADA service provides paratransit buses and minivans for trip making by individuals who have a disability that prevents them from using fixed route bus service. Eligible individuals are those who have difficulty in getting to the bus stop, cannot get onto a bus that is used in regularly scheduled service, or cannot negotiate the trip without assistance.

The ADA paratransit service would take an individual to and from any locations that fall within 3/4 mile from any fixed route bus service for double the regular fare. Within the Connecticut Transit service area, that results in a $2 - $5 one-way fare for the ADA paratransit service. GHTD runs 16,000-17,000 paratransit trips per month, of which approximately 25% are ADA service. GHTD uses nearly 50 vehicles to provide its paratransit service.

The dial-a-ride service is a free service for those aged 60+, or who have a disability, and reside in the communities that include Hartford and West Hartford.

The GHTD is presently undertaking a study of Downtown Circulation which would touch on the eastern end of the study area.

GREATER HARTFORD RIDESHARING CORPORATION

The Greater Hartford Ridesharing Corporation (GHRC), typically known as the "Rideshare Company", is the Capitol Region's Transportation Management Organization (TMO). GHRC is a private, non-profit organization created in 1980 as a partnership of Hartford regional business interests and local, state and federal governments. The Rideshare Company operates a full-scale comprehensive regional ridesharing brokerage, acting as a transportation facilitator and service provider for commuters and employers in both the public and private sectors.

3.8.2 Interface with New Britain – Hartford Busway Project

The West Side Access Study anticipates that the New Britain-Hartford Busway would be fully operational by the year 2020. Changes in travel patterns due to the New Britain-Hartford Busway were taken into consideration in the assessment of year 2020 future travel conditions. The New Britain-Hartford Busway is an exclusive roadway for buses that would link downtown New Britain with downtown Hartford and Union Station. The stations that are planned along the busway are in downtown New Britain, East Main Street, and East Street in New Britain. The Newington station locations are proposed at Cedar Street and Newington Junction (along Willard Avenue). In West Hartford, the proposed stations are located in Elmwood and along Flatbush Avenue. The proposed Hartford station locations are New Park Avenue, Park Street, Sigourney Street, Legislative Office Building (LOB), and Union Station.

3.8.3 Influence of Build/No-Build Alternatives – Public Transit

When the New Britain-Hartford Busway is fully operational there are a number of changes to other existing routes that would take place to better utilize the busway and serve the corridor. All express buses that operate along I-84, such as the Bristol Express, Cheshire/Southington Express, and the New Waterbury Express would use the entire length of the busway between New Britain and Hartford. Some of the local bus routes would be re-routed to better connect with the busway. Within the West side Access Study area the Burritt Street service in Hartford would be rerouted. In addition, there are proposed changes to feeder services along the busway corridor. With in the West Side Access Study area, the Elmwood West Hartford shuttle is a new route that would connect the West Hartford Center to the Elmwood Station. The Oakwood Avenue Station route is a new route that would connect Flatbush Station to West Hartford Center via New Park Avenue, Oakwood Avenue, and Farmington Avenue. Existing CT Transit routes W2, Q2, Q3, Q4, K4, and K5 would be modified to better serve the busway.

The No-Build Alternative would not affect public transportation.

3.9 Truck Movements

Truck activity in the study area was reviewed under existing, Build and No-Build conditions. With the Build Alternative, truck activity is anticipated to reduce in local neighborhoods due to improved access from I-84.

3.9.1 Existing Truck Activity

Truck activity was observed to be high along Farmington Avenue where the truck percentages are 13% during the A.M. peak hour in the vicinity of Sigourney Street. Sigourney Street carries approximately 5% trucks in the vicinity of Farmington Street during the A.M. peak hour period. Sisson Avenue carries approximately 6% trucks that travel towards Farmington Avenue during the A.M. peak hour period. Kane Street carries approximately 11% trucks in the vicinity of Exit 44 during the A.M. peak hour period. Overall, the truck percentages in the area vary from 1% to 10% and are high during the A.M. peak hour period.

In addition, due to inadequate access from I-84 to local arterials, trucks that serve the industrial corridors along Park Street and Sisson Avenue often have to traverse residential neighborhoods. Existing left-hand on and off ramps in the entire study area affects truck access and egress from the highway and therefore, raises a significant safety concern at the interchange.

3.9.2 Influence of Build/No-Build Alternatives – Truck Movements

The Build Alternative would improve truck routing, safety and quality of life in the corridor:

- A full access interchange at Flatbush Avenue/Bartholomew Street would improve connectivity between Park Street and Sisson Avenue industrial corridors and the interchange.

- Residential neighborhoods would experience a reduction in truck traffic.

- Eliminating left hand on and off ramps at Flatbush Avenue and Sisson Avenue would improve safety for trucks.

The No-Build Alternative would not improve conditions for trucks.

3.10 Bicyclist and Pedestrian Needs

Bicycle riders and walking pedestrians are important users of the transportation system and encouraging use of these alternative modes is an interest of ConnDOT and the CRCOG. As noted in the MIS, approximately 10 percent of Hartford residents walk to work. This is a high percentage for a city of its size. The following analysis focuses on accommodations for pedestrians and bicyclists in close proximity to the study area.

3.10.1 Existing Bicycle Facilities

Designated bicycle routes for the state have been developed by ConnDOT and published in their Connecticut Statewide Bicycle and Pedestrian Transportation Plan (March 1999). This document describes the plans from different regional planning associations at the time of publication and gives general guidelines for bike route and path development. In addition, ConnDOT has produced a statewide Bicycle Map. Bicycle accommodation within the study area is limited. Figure 3.10-1 illustrates the routes and trails that exist in the study area based on the statewide bicycle map.

As shown in the figure, a cross-state route runs along Farmington Avenue and turns to Whitney Street and heads north along Whitney Street. In addition, the statewide bicycle map recommends a bicycle route that would enter West Hartford from Farmington along Boulevard Avenue, and then follow West Boulevard into Sisson Avenue, Hamilton Street, Brookfield Street, and into Newington.

There are existing routes along Farmington Avenue, Boulevard Avenue, Park Street/Park Road, and other major and minor arterials that can be used for bicycle travel but are hazardous for bicycle use due to existing traffic volumes. The City of Hartford has identified several locations for constructing bicycle routes within the study area. One of the areas is the Park River where the City would be developing a bicycle route along the river that connects to the Connecticut Riverwalk being developed by the Riverfront Recapture Program.

In addition to the ConnDOT bicycle plan, CRCOG produced the Capitol Region Bicycle Plan in April, 2000 to encourage greater bicycle use in the region by improving facilities, instituting bike safety and enforcement programs, promoting a pro-cycling culture, establishing planning and administrative supports, and obtaining funding for the plan's efforts. This plan evaluated existing facilities in the Capitol Region.

The CRCOG plan lists roads currently used by bicycle commuters, based on surveys performed by the Connecticut Bicycle Coalition and CRCOG. There are several on-road bicycle commuter routes that run within the study area in parts of West Hartford and Hartford:

- Route 176-Brookfield Avenue (also using Pope Park).
- New Park Avenue
- Park Street/Park Road
- West Boulevard
- Farmington Avenue
- Asylum Street/Asylum Avenue

There are no existing off-road bike paths in the study area towns. CRCOG's Capitol Region Bicycle Plan mentions planned paths in the region, including the Farmington Canal trail and the Charter Oak trail. The Farmington Canal trail would eventually connect Northampton, MA and New Haven and the Charter Oak trail would eventually connect Hartford to Providence. Both of these trails are important segments of an East Coast Greenway bike trail being developed from Key West, Florida to Calais, Maine. In addition, a trail along the Connecticut River from Suffield to Rocky Hill is in various stages of development.

CRCOG's bike plan identifies corridors with potential for providing multi-use trails, and lists the New Britain – Hartford Busway as one location. A multi-use trail/bike path is being developed for the New Britain – Hartford Busway. Another corridor nearby would be the South Park River corridor, which would cover the southwestern portion of Hartford east of I-84 near Pope Park. The Griffin Corridor would run through Hartford and Bloomfield and continue north of the terminus of the proposed busway corridor. Other potential trail corridors elsewhere in the region include the Connecticut Southern Corridor in Enfield, East Windsor and South Windsor, the Dike System along the Connecticut River in Hartford, and the North Meadows Rail Corridor in Hartford. In addition, the bike plan identifies the need for a connection through Hartford and West Hartford between the Farmington Canal Trail and the Charter Oak Greenway.

Other goals that the CRCOG Bike Plan promotes include improving existing bike routes and land use to make the entire trip easier on the bicyclist. Bike route improvements may include widening shoulders, repaving rough surfaces, upgrading grates, and installing signage. Land use improvements include secure bike parking, improved access to facilities, adequate lighting, and shower facilities.

There are other trails being planned by local groups that are within the West Side Access Study area. These proposed multi-use trails would help to bridge the gap in the pedestrian and bicycle access in the area.

The South Branch Partnership Committee has proposed a trail design for the South Branch of the Park River. The trail would start at Park Street and run south between Brookfield Street and the South Branch River. At approximately Flatbush Avenue the trail would follow the South Branch River until Newfield Avenue. At this point the trail parallels New Britain Avenue and the South Branch River. From New Britain Avenue it stays along the roadway until the intersection of

Newington Road and New Britain Avenue. The trail would continue along Newington Road south to connect with the proposed multi-use trail to be built with the New Britain-Hartford Busway Project.

The Parkville Transportation and Community and System Preservation (TCSP) was given a grant to plan a bike trail along Park Avenue from Prospect Avenue east to the I-84 overpass to Pope Park Drive and Laurel Street. Then the trail would go north on to Laurel Street and stop at the intersection of Laurel Street and Hawthorn Street. The proposed design is to reduce the travel lanes on Park Street from two lanes having the existing lane be stripped a bicycle/pedestrian lane. This project would add lighting and traffic claming aspects along the trail.

The Town of West Hartford has also recently conceptualized a possible walking/bicycle trail paralleling Trout Brook. This trail would start at New Park Avenue immediately north of Trout Brook and continue north to Trout Book Drive's intersection with Asylum Avenue. A segment of this possible trail already exists between West Boulevard and Farmington Avenue. The Hartford City Council has endorsed a bike path, the "Hartford Parks Bike Tour Path". This path passes through Hartford along Park Street.

3.10.2 Pedestrian Needs

To understand the pedestrian needs in the corridor, an inventory of existing sidewalks, crosswalks, and street lighting was undertaken throughout the study area. The results of the field surveys indicated that sidewalks and crosswalks exist in many locations along the corridor. Adequate street lighting is provided on one side of the roadway, if not both sides of the roadway. The major arterial routes that were surveyed are as follows:

Farmington Avenue

Farmington Avenue is an arterial that connects communities from the west to downtown Hartford. In the study area, it travels through West Hartford Center and a number of roadside retail and commercial activity centers. It attracts a sizable amount of pedestrian activity due to the retail and commercial centers. Currently, Farmington Avenue has sidewalks along the roadway for pedestrians and crosswalks at intersection locations. Sidewalks are present starting at Prospect Avenue all the way to downtown Hartford. Street lighting is also provided along Farmington Avenue on both sides of the roadway. Parking is restricted at some locations during peak hours of traffic flow.

Capitol Avenue

Capitol Avenue is an arterial running parallel to Farmington Avenue in an east-west direction that is primarily residential in the West Hartford area. As it approaches Hartford, there is more commercial activity seen along the roadway. Sidewalks are present along Capitol Avenue throughout the length of the corridor. Crosswalks are present in downtown locations where there is heavy traffic volume activity on the roadway. Street lighting is provided along the roadway. Parking is provided in the vicinity of Prospect Street on both sides of the roadway for residential

uses. Parking is restricted along Capitol Avenue east of Laurel Street in Hartford to Park Terrace and in downtown Hartford in the vicinity of Oak Street and Broad Street.

Park Street

Park Street, like Capitol Avenue, runs in an east-west direction and connects to points in downtown Hartford. Sidewalks are present along Park Street throughout the length of the corridor. Park Street provides commercial services to residential neighborhoods and therefore some pedestrian activity is seen along the roadway. At heavy volume locations, crosswalks are provided for pedestrians crossing Park Street. Street lighting is provided along Park Street in West Hartford and Hartford. Parking is mostly seen on both sides of the street along Park Street, but at a few locations like between Hazel Street and Laurel Street, parking is not allowed along Park Street. Similarly, between Laurel Street and Park Terrace, parking is restricted on both sides during the evening peak hour.

Flatbush Avenue

Flatbush Avenue provides connectivity to points in West Hartford from I-84. Sidewalks are present along Flatbush Avenue on both sides of the roadway between New Park Avenue and the I-84 ramp terminus. East of the I-84 ramps and Flatbush Avenue intersection, an existing sidewalk exists only in the eastbound direction. At the Flatbush Avenue intersection with New Park Avenue, due to heavy traffic volumes, crosswalks are provided for pedestrians to cross over either Flatbush Avenue or New Park Avenue. Street lighting along Flatbush Avenue is provided only on the south side of the street. Parking is not allowed along Flatbush Avenue at all times during the day between New Park Avenue and Brookfield Street.

Sigourney Street

Sigourney Street runs in a north-south direction and provides access to the I-84 ramps to and from the east. Sidewalks are present on both sides of the roadway to provide access for pedestrians using parking lots that serve Aetna and other major employers in the area. Street lighting is provided on both sides of the street. Parking is not allowed along Sigourney Street between Farmington Avenue and the on-ramp to I-84 eastbound.

Hawthorn Street

Hawthorn Street runs in a northeast direction and provides access to Sigourney Street and Laurel Street. This area of Hartford is primarily commercial. As it approaches Forest Street, there is a larger residential area along the roadway. Sidewalks are present along Hawthorn Street on both sides of the roadway. Street lighting is provided on both sides of the street. Parking is not allowed along the roadway.

Laurel Street

Laurel Street runs in a north-south direction and provides connectivity to Farmington Avenue, Capitol Avenue and Park Street. Sidewalks are present on both sides of the roadway. They are also provided along both sides of the bridge over the railroad tracks. Parking is allowed on the side of Laurel from Farmington Avenue to Hawthorn Street. South of Hawthorn Street, parking is not allowed. Laurel Street between Farmington Avenue and Hawthorn Street is primarily residential.

3.10.3 Influence of Build/No-Build Alternatives – Bicycle/Pedestrian

One of the goals of the Build Alternative is to increase the viability of alternative modes of travel, including bicycles and pedestrians. Increased connectivity would be provided by the implementation of the multi-use trail. Figures 2.3-1 and 2.3-4 show the pedestrian/bicycle modifications that would be incorporated into the West Side Access Build Alternative. All new roadways would include sidewalks. Improving sidewalks and lighting conditions along the study area would provide the opportunity to reconnect the community. Interference with existing bicycle routes would be minimized and would include possible improvements to bicycle routes and multi-use paths.

The No-Build Alternative could adversely affect conditions for pedestrians and bicyclists over time if local traffic volumes increase.

3.11 ITS Recommendations

I-84 within the study corridor is presently part of an incident management system managed out of both the City of Hartford Traffic Control Center and the ConnDOT Center in Newington. The need and opportunity to further supplement this system would be considered during the development of the design. In addition, the traffic signals may be included in the City of Hartford's Traffic Signal System.

Chapter 4
SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

A preliminary review of the social, economic and environmental sensitivity of the study corridor has been conducted. The existing conditions, as well as the influence of the Build and No-Build Alternatives (year 2020) are presented here.

4.1 Noise

Noise is excessive or unwanted sound. Sound intensity is measured in decibels, and an "A-weighted" scale simulates the response of the average human ear. Thus, noise levels in this study are expressed as dBA, or "A-weighted" decibels. Figure 4.1-1 presents typical noise levels associated with various activities. Other important characteristics of sound and noise:

- The average human ear cannot perceive a noise increase or decrease of approximately 3 dBA. A 10 dBA increase is perceived as a "doubling" of noise, so a 60 dBA noise level is perceived as "twice as loud" as a 50 dBA noise level.

- To block sound waves, one must interrupt the noise path from source to receptor. However, sound waves can be bent or diffracted. Thus some sound waves, especially at lower frequencies, will diffract over the top and around the edges of obstacles such as sound barriers. In some cases, depending upon construction, noise can be transmitted through barriers, or be reflected by barriers.

- The ambient noise level is the sum of the surrounding noise sources (both natural and man-made) for that given location.

- Roadway vehicle noise comes from tires, engines, and exhaust.

L_{eq}, or Equivalent Level, is the steady-state noise level during a given amount of time that has the same acoustic energy as the fluctuating noise levels that occur during that time period. Typically, the L_{eq} is used to reflect the noise level over a one-hour period, in which case it would be called $L_{eq}(h)$.

FHWA and ConnDOT have established noise level criteria that are used to determine if project-related noise levels create a significant impact to nearby properties (receptors). If post-project noise levels approach, meet or exceed these noise level criteria, some form of mitigation (such as noise walls) should be considered. These noise criteria are based upon land use types, and are shown in Table 4.1-1.

Table 4.1-1
FHWA and ConnDOT Criteria for Noise Abatement

Agency	Land-Use Category	Noise Level /Metric	Description
FHWA Noise Abatement Criteria (NAC) [1,2]	A	57 $L_{eq}(h)$	Lands on which serenity and quiet are of extraordinary significance.
	B	67 $L_{eq}(h)$	Residences, hotels, schools, churches, libraries, hospitals, parks and other recreational areas.
	C	72 $L_{eq}(h)$	Developed lands, properties, or activities not included in Categories A and B above.
	D	--	Undeveloped lands.
	E	52 $L_{eq}(h)$ [3]	Indoor: residences, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.
ConnDOT Policy	--	Background + 15 dBA $L_{eq}(h)$	Impact occurs when the future project noise levels are estimated to "substantially exceed" (by 15 dBA or greater) the existing background levels.

[1]An "impact" is recognized when noise levels "approach" (come within 1 dBA) of standard.
[2]ConnDOT's Noise Abatement Criteria closely parallels FHWA.
[3]The criterion for interior locations is given for various receptor types.

4.1.1 Affected Environment

A noise monitoring program was conducted to establish the existing ambient background noise levels within the study area and to develop base criteria noise limits. All noise measurements and analysis were conducted in accordance with the FHWA's guidelines. Ambient noise levels were measured using a Metrosonics dB308 sound level analyzer that was calibrated for accuracy with a Metrosonics Acoustical Calibrator, Model CL 304. Microphones were mounted at a height of five feet and protected from wind induced 'self-noise' with a windscreen.

Noise measurements were obtained at those receptor locations deemed to be most sensitive to noise from the Build Alternative. In addition, several receptors were evaluated because they were listed previously on ConnDOT's noise wall retrofit list. Receptors modeled are shown in Figure 4.1-2.

It should be noted that the noise monitoring effort attempted to monitor worst-case conditions; that is, highest volumes of traffic moving at the highest speeds. Therefore, the monitoring periods that were used were 15-minute blocks of time during the high-volume weekday AM and PM peak periods, but not exactly at the absolute peak, since traffic congestion would result in slower speeds.

The results of the noise-monitoring program, conducted in April and May 2001, are shown in Table 4.1-2

Table 4.1-2
Results of the Noise Monitoring Program

Receptor Description				FHWA NAC Category (From Table 4.1-1)	Monitored	
ID	Location	City/ Town	Land Use		AM/PM Period[1]	Noise Level, dBA $L_{eq}(h)$
1	214 Brookfield Street	Hartford	Residential	B	AM	59
2	28 Rose Street[2]	Hartford	Residential[3]	B	PM	66
3	136 Bartholomew Avenue	Hartford	Residential	B	PM	60
4	25 Laurel St. (Underwood Apts.)	Hartford	Residential	B	PM	65
5	784-786 Capitol Avenue	Hartford	Residential	B	PM	60
6	30 Forest Street	Hartford	Residential	B	PM	63
7	98 Caya Avenue [2]	West Hartford	Residential	B	AM	73
8	Pope Park near I-84 and Park St.	Hartford	Recreational	B	AM	61
9	186-188 Laurel Street	Hartford	Residential	B	PM	66
10	Hartford High School, Forest Street	Hartford	Recreational	B	PM	56
11	Wellington Street[2]	Hartford	Industrial[4]	C	AM	64

[1]The AM or PM period was selected based upon worst-case traffic conditions on the I-84 mainline near the receptor.
[2]ConnDOT noise wall retrofit program locations.
[3]The house on this site has been razed, but ConnDOT had evaluated it previously as part of its noise wall retrofit program. Other residences are nearby.
[4]This site was evaluated because it was formerly residential in nature and ConnDOT had evaluated it previously as part of its noise wall retrofit program. All residences in the area have been razed, and the site is now industrial.

4.1.2 Environmental Consequences of Alternatives on Noise

For each of the selected receptor locations identified in Table 4.1-3, future (year 2020) noise levels under the Build Alternative were compared with the FHWA Noise Abatement Criteria (NAC).

Existing noise levels were modeled using the FHWA's Traffic Noise Model (TNM) and modeled results for existing conditions were compared to the monitored values to calibrate the model. Noise levels for future year 2020 No-Build and Build scenarios were estimated using the TNM model to predict noise levels at the receptors. TNM was used to compute the hourly L_{eq} noise levels for all selected receptor locations. The predicted peak-hour L_{eq} noise levels under the Build scenario were compared with the FHWA NAC to determine if levels "approach" (come within 1 dBA) of the NAC. In addition, the future year build levels were compared to existing levels to determine if a 15 decibel increase ("substantially exceed existing levels") would occur.

In addition to site observations, maps illustrating the Build Alternative, terrain contour lines, and ground zones were also used to enhance the modeling assessment by providing details on the noise propagation path to account for various terrain features. Noise shielding effects from buildings, tree zones, and roadway jersey barriers were also taken into account.

The results of the noise modeling impact assessment using the FHWA criteria are shown in Table 4.1-3.

Table 4.1-3
Results of TNM Noise Modeling

ID	Location	NAC	2001 Monitored Values		2020 No-Build		2020 Build, No Abatement	
			AM/PM Period Monitored	Existing Noise Level, $L_{eq}(h)$, dBA	AM Peak, $L_{eq}(h)$ dBA	PM Peak, $L_{eq}(h)$ dBA	AM Peak, $L_{eq}(h)$ dBA	PM Peak, $L_{eq}(h)$ dBA
1	214 Brookfield Street	B	AM	59	63	62	65	64
1a	Brookfield Street Residence	B	--	--	--	--	66	66
2	28 Rose Street	B	PM	66	71	71	69	68
3	136 Bartholomew Ave.	B	PM	60	66	66	66	68
4	25 Laurel St. (Underwood Apts.)	B	PM	65	65	65	55	55
5	784-786 Capitol Avenue	B	PM	60	63	63	59	59
6	30 Forest Street	B	PM	63	63	64	59	61
7	98 Caya Ave.	B	AM	73	73	71	70	69
8	Pope Park near I-84 and Park St.	B	AM	61	66	65	66	65
9	186-188 Laurel Street	B	PM	66	70	70	64	63
10	Hartford High School, Forest Street	B	PM	56	57	60	52	52
11	Wellington Street	C	AM	64	68	67	69	68

An additional receptor, Receptor 1a, was added in the middle of the block near receptor 1 to refine the modeling effort, because Receptor 1 has future year modeled results close to the NAC, and Receptor 1a was slightly closer to the I-84 mainline, and would have slightly higher noise levels.

As Table 4.1-3 shows, modeled 2020 No-Build noise levels are in all cases higher than the existing monitored values for AM or PM peak periods. The reason for this is two-fold. First, there would be some minor increases in traffic levels on area roadways between the current year

and 2020. Secondly and more importantly, as a conservative modeling technique, it was assumed that traffic in the future would be operating at posted speeds (which on the I-84 mainline is 50 mph for the entire study area). In reality, the peak hour volumes of I-84 mainline traffic modeled in the future are not expected to attain those speeds; the speeds of the traffic monitored for existing conditions were substantially lower. Therefore, the modeled noise levels in the 2020 No-Build scenario (and also the Build scenario) are conservatively high.

There are no locations in the study area where future build noise levels meet the ConnDOT impact determination of substantial increase of 15 decibels. At many locations, noise levels associated with the roadway modifications would actually decrease below existing levels. The most pronounced increase in noise over existing conditions is at Receptor 3, where noise would increase by 8 decibels over existing conditions during the PM peak hour.

Table 4.1-3 shows that noise levels are anticipated to both increase and decrease at selected receptors between the No-Build and Build scenarios. These increases or decreases can be attributed to changes in the traffic volumes or by changes in the elevation and alignment of modeled roadways. At Receptor 4, the reconstructed I-84 mainline would be in a cut section, whereas today, the mainline roadways are slightly above grade. Therefore, noise levels at this location may decrease below future year No-Build levels. The removal of ramps at the Sisson Avenue Interchange and reduction in volumes with the construction of Boulevard Extended would reduce noise levels from the No-Build scenario at Receptors 5, 6, and 10. Diversion of traffic from the eastbound Prospect Avenue off-ramp (Caya Avenue) to the new Bartholomew Avenue interchange would reduce noise levels at Receptor 7.

Several locations would experience modest peak hour increases in noise as some traffic diverts to other areas. At Receptor 1, the presence of new on-ramps and increased traffic on the new Bartholomew Extended roadway would result in about a 2 decibel increase in noise. Similarly, at Receptor 3, increased volumes on Bartholomew Avenue are expected over No-Build conditions, reflecting a 2 decibel increase in noise at this location.

In addition to ConnDOT's 15 decibel substantial increase criterion for determining impact, FHWA's criteria recognizes an impact when noise levels "approach" (within 1 decibel) of the NAC, which for residential properties is 67 dBA $L_{eq}(h)$. In the case of all the residential receptors, this means that a future noise level of 66 dBA $L_{eq}(h)$ or higher would be a noise impact, potentially warranting consideration of noise abatement. The receptors that would have noise levels that approach, equal, or exceed the NAC are 1a, 2, 3, 7, and 8. Receptor 8 is in a park, and has no residential receptors that are affected, so mitigation there is not considered reasonable.

Receptor 11 was formerly classified as NAC "B" when it had residential properties, but since it is now industrial in nature and all the houses have been removed from the area, it is now subject to NAC "C." Therefore, it is not impacted noise levels created by the Build Alternative, which would exceed 66 dBA $L_{eq}(h)$, but do not approach the NAC "C" level of 72 dBA $L_{eq}(h)$.

The potential for mitigation at impacted Receptors 1/1a, 2, 3, and 7 is discussed below in Section 4.1.3.

The No-Build Alternative would not substantially increase (i.e., less than 3 decibel increase) noise in the study area.

4.1.3 Mitigation of Impacts from Noise

Noise impacts can be abated (mitigated) through provisions of a barrier to block the walls, such as noise walls or berms. ConnDOT typically uses walls because they require less space (are narrower) than berms. The potential for providing noise walls as a component of the Build Alternative was investigated at Receptors 1/1a, 2, 3, and 7, because these were the locations identified as approaching, meeting or exceeding the NAC under the Build Alternative.

ConnDOT has several criteria for determining if noise abatement is feasible and reasonable:

- Abatement measures must provide at least a 7 decibel reduction in noise levels at first-row sensitive receptors in the middle of the wall.

- Abatement measures must have an acceptable cost per residence abated. To count as an "abated" residence, it must experience at least a 3 decibel reduction in noise levels and be within 300 feet of the roadway travel lane(s). ConnDOT applies a $50,000 per abated residence index.

- ConnDOT also judges abatement that does not meet the $50,000 per residence index based upon the number of people per dwelling unit, using other formulas at its own discretion.

At Receptors 1, 1a, 2, 3, and 7, the TNM model was used to identify the benefits that would be provided by noise walls in these areas. Noise walls were only considered to be practicable along unbroken segments along the I-84 right of way, either along the mainline, or next to on-ramps or off-ramps. Noise walls would not be practicable along roadways that would become local city streets, such as Boulevard Extended or Bartholomew Avenue. Noise walls were investigated at different heights and were assumed to practicable up to a maximum of 5 meters (16.4 feet) in height.

Table 4.1-4 summarizes the results of the noise mitigation efforts. As the table shows, the noise barriers that were investigated would only have varying levels of success at abating the noise along the corridor.

Noise barriers near Receptors 1 and 1a would block noise on the eastbound I-84 on-ramp at Bartholomew Avenue, and the eastbound mainline roadway. Only a 3 decibel reduction in noise would be expected, primarily because the barriers would block sources of noise at the on-ramp and mainline that are relatively distant from the receptors. Receptor 1a is about 72.5 meters (238 feet) from the I-84 on-ramp and about 93.0 meters (305 feet) from the eastbound mainline. Furthermore, new noise generated from higher traffic volumes on the new Bartholomew Extended roadway could not be abated from noise walls. Therefore, only about a 3 decibel reduction was achieved at these two receptors, using a 5-meter-high wall.

Table 4.1-4
Results of TNM Noise Barrier Analysis

ID	Location	Critical Period	Represents # of Dwelling Units[1]	Length of Barrier(s) in Feet	2020 Build, No Abatement, Leq(h), dBA,	2020 Build, With Abatement, Leq(h), dBA	Total Reduction, Leq(h), dBA
1	214 Brookfield Street	AM	12	1,025 925[2]	65	62	3
1a	Brookfield Street Residence	AM			66	63	3
2	28 Rose Street	AM	13	1,428	69	64	5
3	136 Bartholomew Ave.	PM	10		68	68	0
7	98 Caya Ave.	AM	19[3]	323[3]	70	63	7

[1]Dwelling Units listed are a comparable distance from the I-84 mainline, ramps and/or other roadways as the representative receptor. Therefore, those other units would be similarly impacted by the roadway modifications and similarly abated by noise walls.
[2]Includes a 1,025 foot barrier on the Eastbound Bartholomew Ave. on-ramp and a 925 foot barrier on the mainline.
[3]The barrier and count of dwelling units were arbitrarily stopped because this off-ramp is the beginning of the study area and the edge of the available mapping. It is likely that it would be reasonable to extend this barrier further to the west to benefit more properties along Caya Avenue beyond the study area limits.

A noise barrier near Receptors 2 and 3 would abate noise along the westbound I-84 mainline at Hamilton Street and continue westward, following the westbound off-ramp to Bartholomew Avenue. A 5 decibel reduction was calculated at Receptor 2 using a 5-meter-high wall. Receptor 3 would receive no reduction in noise because of its greater distance from the I-84 mainline, and because this receiver would be affected more by traffic on Bartholomew Avenue (which cannot be abated) than by the I-84 mainline.

A noise barrier near Receptor 7 would abate noise along the eastbound Prospect Avenue off-ramp to Caya Avenue. An apartment building at 98 Caya Avenue would experience abatement on the first floor, along with single family homes further to the west along Caya Avenue. (Noise levels would likely not be abated at upper level dwellings that are higher than the wall). The count of properties and the length of the barrier were limited as noted in footnote #3 of Table 4.1-4. A noise barrier 5 meters (16.4 feet) in height would achieve a 7 decibel reduction at the apartments.

Because noise walls near Receptors 1, 1a, 2 and 3 would not achieve a 7 decibel reduction in noise levels, they are not considered reasonable. A noise wall between properties on Caya Avenue and I-84 would achieve a 7 decibel noise reduction. A 98.4 meter (323 foot-long) wall that is 5 meters (16.4 feet) in height would be expected to cost about $79,500 and is expected to benefit an estimated 19 dwelling units. Therefore, at an estimated cost of $4,184 per benefited dwelling unit, a wall at this location is considered reasonable, as it is well within ConnDOT's cost-effectiveness index of $50,000 per residence. A wall at this location would be considered as

a mitigative measure during a design phase. It is likely that a longer wall that extends westward, beyond the limits of the study area, would mitigate impacts on more dwellings and would also be reasonable.

Further traffic noise barrier design would be undertaken during a design phase, when the exact alignment and profile of the roadway modifications would be determined. This evaluation would determine recommended barrier lengths and heights.

4.2 Air Quality

4.2.1 Affected Environment

Motor vehicles generate carbon monoxide (CO), nitrogen oxides/hydrocarbons (ozone precursors), lead, and suspended particulates. Under the Clean Air Act, the EPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants to protect the environment and public health. Table 4.2-1 shows both the NAAQS and Connecticut State Standards under Regulation Section 22a-174-24, which are similar.

EPA currently classifies the study area as a “serious” non-attainment area (does not meet the NAAQS) for ozone. The study area is in attainment for all other criteria pollutants. In 1996, the EPA redesignated the Hartford area as being in “attainment maintenance” for CO, because it was shown that the area was meeting the NAAQS for CO over a number of years; conformity regulations still apply. Lead, particulates, and sulfur dioxide are not of critical concern in the Hartford area; motor vehicles have little impact on these pollutants in this region of the country.

The air pollutant that is of most concern is carbon monoxide (CO). An odorless, invisible gas produced by incomplete combustion of fossil fuels, it is dangerous to humans in high concentrations because it binds to red blood cells more effectively than oxygen, limiting the oxygen available for respiration.

Ozone is a molecule of oxygen with three oxygen atoms and is an important constituent of the upper levels of the atmosphere, protecting living things from damaging ultraviolet radiation (the "ozone layer"). However, near the earth's surface, ozone is a respiratory irritant and a major contributor to photochemical smog. Motor vehicles emit nitrogen oxides and hydrocarbons, which are ozone precursors.

As required by the Clean Air Act, the DEP has prepared a State Implementation Plan (SIP) that explains how the Hartford region plans to attain the NAAQS for ozone. The SIP includes analysis of ozone levels in the region, commitments to the required emission control programs, and implementation schedules to reach attainment. Under Section 176(c) of the Clean Air Act, Federal agencies are prohibited from engaging in, supporting in any way, providing financial assistance for, licensing or permitting, or approving any activity that does not conform to an approved SIP. A "conforming" project is defined as one that conforms to the SIP's objectives of reducing or eliminating the severity or number of NAAQS violations in the state, and achieving expeditious attainment of the NAAQS; that does not cause or contribute to new NAAQS violations; does not increase the frequency or severity of any existing NAAQS violation; and

Table 4.2-1
National Ambient Air Quality Standards (NAAQS) and Connecticut Standards[1]

Pollutant	Standard	Averaging Period	NAAQS	Connecticut
Carbon Monoxide (CO)	Primary (NAAQS) Primary and Secondary (CT)	8-Hour Average 1-Hour Average	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)
Ozone (O_3)	Primary and Secondary	1-Hour Average[2] 8-Hour Average[2]	0.12 ppm (235 µg/m^3) 0.08 ppm (157 µg/m^3)	0.12 ppm (235 µg/m^3) N/A[2]
Nitrogen Dixide (NO_2)	Primary and Secondary	Annual Arithmetic Mean	0.05 ppm (100 µg/m^3)	0.05 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2)	Primary Primary Secondary	Annual Arithmetic Mean 24-Hour Average 3-Hour Average	0.03 ppm (80 µg/m^3) 0.14 ppm (365 µg/m^3) 0.50 ppm (1300 µg/m^3)	0.03 ppm (80 µg/m^3) 0.14 ppm (365 µg/m^3) [3] 0.50 ppm (1300 µg/m^3)
Particulate Matter <10 micrometers (PM_{10})	Primary and Secondary Primary and Secondary	Annual Arithmetic Mean 24-Hour Average	50 µg/m^3 150 µg/m^3	50 µg/m^3 150 µg/m^3
Particulate Matter <2.5 micrometers ($PM_{2.5}$)	Primary and Secondary Primary and Secondary	Annual Arithmetic Mean 24-Hour Average	15 µg/m^3 65 µg/m^3	15 µg/m^3 65 µg/m^3
Lead (Pb)	Primary and Secondary	Quarterly Average	1.5 µg/m^3	1.5 µg/m^3

[1]Units are in parts per million (ppm), milligrams per cubic meter (mg/m^3) and micrograms per cubic meter (µg/m^3).

[2]The federal ozone 1-hour standard has been temporarily revoked by the US EPA, and the 8-hour standard is under reevaluation. Areas such as Connecticut that were out of attainment at the time of the revocation of the standard are still currently regulated by the 1-hour standard until the 8-hour standard is reintroduced. Connecticut does not have an 8-hour standard for ozone.

[3]Block Averages, rather than moving averages.

does not delay the state's timely attainment of the NAAQS or impede required emission reductions or any other air quality milestones.

Projects that are funded by FHWA, or U.S.C. Title 23 are subject to the EPA transportation conformity rules (40 CFR Part 51 Subpart T). If advanced, the Build Alternative would be expected to receive FHWA funding, and, therefore, would be subject to the EPA transportation conformity rules. FHWA is responsible for making a conformity determination after EPA is consulted and provides a recommendation.

Metropolitan Planning Organizations (MPOs) are responsible for demonstrating an area's conformity with the SIP. The study area is located within the geographical boundaries of the Capitol Region Council of Governments (CRCOG). CRCOG prepares a Transportation Plan (TP) and Transportation Improvement Program (TIP) for its geographical area. Under the EPA transportation conformity rules, conformity of a specific project is achieved if the project is included in the emission inventory of a conforming TP or TIP. A project not included in a conforming TIP must prepare a project-level emission analysis.

The West Side Access Build Alternative has been included in the emission calculations in the TIP for CRCOG. EPA and FHWA have approved the TIP as conforming to the SIP. Therefore, a separate project-level emission inventory analysis and conformity determination are not required.

In addition, based on the EPA conformity requirements at 40 CFR 93.116, ambient pollutant concentrations due to the build condition must not create or contribute to a new violation of the NAAQS, nor worsen any existing violation of the NAAQS. The air quality modeling analysis for the West Side Access Build Alternative was performed to demonstrate compliance with the NAAQS for CO in accordance with this conformity requirement.

There are two DEP-operated CO monitors in Hartford, a single ozone monitor in East Hartford, and a single NO_2 monitor in East Hartford. Tables 4.2-2 through 4.2-4 indicate the results of the monitoring performed in 2000, the most recent year available. The tables indicate that the Hartford region did not exceed the NAAQS or Connecticut standards in 2000 for CO or NO_2.

Table 4.2-2
2000 Monitored CO Concentrations in Hartford Region, Parts Per Million (ppm)

CO Monitoring Location	1-Hour Average			8-Hour Average		
	Highest	2nd Highest	1-Hour NAAQS[1]	Highest	2nd Highest	8-Hour NAAQS[1]
401 Flatbush Avenue, Hartford	3.3 ppm	3.1 ppm	35.0 ppm	3.0 ppm	2.7 ppm	9.0 ppm
Courthouse, 155 Morgan St., Hartford	18.0 ppm	15.2 ppm	35.0 ppm	8.5 ppm	7.3 ppm	9.0 ppm

Source: US EPA AIRData website, http://www.epa.gov/air/data/index.html
[1]The State of Connecticut Standard is identical to the NAAQS.

Table 4.2-3
2000 Monitored One-Hour[1] Ozone Concentrations in Hartford Region, Parts Per Million (ppm)

Ozone Monitoring Location	Highest	2nd Highest	NAAQS	Number of Days in 2000 with 1-Hour Concentrations Exceeding NAAQS
McAuliffee Park, East Hartford	0.120 ppm	0.101 ppm	0.12 ppm	0

Source: US EPA AIRData website, http://www.epa.gov/air/data/index.html
[1]See Footnote 2 of Table 4.2-1 for more detail on the status of One-Hour and Eight-Hour NAAQS.

Table 4.2-4
2000 Monitored NO_2 Concentrations in Hartford Region, Parts Per Million (ppm)

NO_z Monitoring Location	Annual Arithmetic Mean	NAAQS[1]
McAuliffee Park, East Hartford	0.017 ppm	0.05 ppm

[1]The State of Connecticut Standard is identical to the NAAQS.
Source: US EPA AIRData web site, http://www.epa.gov/air/data/index/html

4.2.2 Environmental Consequences of Alternatives on Air Quality

The air quality modeling analysis for the West Side Access Build Alternative consisted of a microscale (local area) analysis to estimate maximum one- and eight-hour CO concentrations at traffic intersections within the study area. The microscale analysis used dispersion modeling techniques and was performed in accordance with EPA's 1992 "Guideline for Modeling CO from Roadway Intersections." This screening process followed five steps:

1. Using the capacity analyses performed for the traffic modeling studies, up to 20 intersections were inventoried in a list based upon the Build Alternative's effects on altering volumes, geometrics, or adversely affecting Levels of Service (LOS) at those locations over the No-Build scenario in 2020. All new intersections that are created by the Build Alternative would be included in this inventory. All reconstructed ramp termini would be included in this inventory. Intersections where there would be an improvement or no effect on overall LOS would not be

included in the inventory. Step one resulted in a total of 9 intersections being inventoried for further screening out of 42 signalized intersections total. Table 4.2-5 shows all the intersections considered, and the intersections that were inventoried (shown in shading).

2. The intersections inventoried in Step One were ranked for total traffic volume during their worst-case peak period in the year 2020. The three highest-volume intersections would be selected for modeling.

3. The intersections inventoried in Step One were ranked by total LOS. Those intersections that operate at a total LOS of A, B, or C were eliminated from consideration. The remaining intersections that operate at LOS D, E, or F were ranked by LOS and by total delay. The three intersections with the worst LOS and highest total delay would be selected for modeling.

Table 4.2-5
Intersections Evaluated During Step One of Screening Process

Intersection	2000 Existing		2020 No-Build		2020 Build		Inventory Condition Met
	AM	PM	AM	PM	AM	PM	
Farmington Ave. and Broad Street	F	D	F	D	F	D	
Farmington Ave. and Sigourney Street	C	B	C	C	C	C	
Farmington Ave. and Laurel Street	**B**	**D**	**C**	**D**	**D**	**E**	**LOS Degradation**
Farmington Ave. and Sisson Ave./Sherman Avenue	F	D	F	E	D	E	
Farmington Ave. and Prospect Ave.	C	C	C	C	C	C	
Capitol Ave./Boulevard Ave. and Prospect Avenue	D	D	D	F	D	F	
W. Boulevard Ave. and Prospect Avenue	C	E	C	C	C	C	
W. Boulevard Ave. and Sisson Ave./I-84 Off Ramps	**F**	**F**	**F**	**F**	**D**	**E**	**Ramp Reconfigured**
Hawthorn Street and Laurel Street	B	C	D	F	D	D	
Sigourney Street and Hawthorn Street	B	D	B	D	B	D	
Sigourney Street and I-84 WB Off Ramp (Exit 47)	F	F	D	C	D	C	
Sigourney Street and I-84 EB On Ramp (Exit 47)	B	E	B	E	B	E	
Capitol Ave. and Park Terrace	C	C	D	D	C	D	
Capitol Ave. and Sisson Ave.	C	C	C	D	C	C	
Capitol Ave. and Forest Street	B	C	B	D	B	B	
Capitol Ave. and Laurel Street	C	F	F	F	C	C	
Capitol Ave. and Park Place	A	B	C	B	B	B	
Capitol Ave. and Flower Street	B	C	B	C	B	C	
Capitol Ave. and Broad Street	D	F	D	F	D	F	
Capitol Ave. and Hungerford Street	A	B	A	B	A	B	
Capitol Ave. and Oak Street/I-84 Ramps	F	F	F	F	F	F	
Park Street and New Park Ave./Sisson Ave.	C	D	D	F	D	F	

Intersection	2000 Existing		2020 No-Build		2020 Build		Inventory Condition Met
	AM	PM	AM	PM	AM	PM	
Park Street and Laurel St./Pope Park Dr.	C	C	C	D	C	D	
Park Street and Park Terrace	C	D	C	F	B	F	
Kane Street and New Park Ave.	C	C	C	D	C	C	
Kane Street and Oakwood Avenue	B	B	B	B	B	B	
Prospect Avenue and Kane Street	B	C	C	D	B	C	
Prospect Avenue and Park Road/Park Street	C	C	C	D	C	C	
Prospect Avenue and New Park Avenue	A	B	A	B	A	B	
Kane Street and Plaza/I-84 WB Ramps	C	C	C	C	C	C	
Caya Avenue/I-84 EB on Ramp and Prospect Ave.	B	B	C	C	B	B	
Flatbush Ave. and New Park Ave.	D	F	D	F	C	F	
Flatbush Ave. and I-84 Ramps/Community Place	**C**	**D**	**C**	**C**	**C**	**B**	**Ramp Reconfigured**
Flatbush Ave. and Brookfield Street	C	C	C	C	C	C	
Grace Street/Hamilton St. and New Park Ave.	C	C	C	E	B	D	
Hamilton Street and Bartholomew Ave.	**B**	**B**	**B**	**B**	**B**	**C**	**LOS Degradation**
Hamilton Street and Pope Park Drive	C	D	D	E	D	E	
I-84 EB On Ramp and Bartholomew Ave.	**-**	**-**	**-**	**-**	**B**	**C**	**New Intersection**
I-84 WB On Ramp and Bartholomew Ave.	**-**	**-**	**-**	**-**	**C**	**C**	**New Intersection**
Boulevard Extended and I-84 Ramps	**-**	**-**	**-**	**-**	**C**	**C**	**New Intersection**
Boulevard Extended and Hawthorn St.	**-**	**-**	**-**	**-**	**B**	**C**	**New Intersection**
Boulevard Extended and Laurel St.	**-**	**-**	**-**	**-**	**B**	**B**	**New Intersection**

As Table 4.2-6 shows, the three intersections with highest volume and total delay were ranked, and a total of five intersections were selected in Steps 2 and 3. (The intersection of West Boulevard Avenue, Sisson Avenue, and the I-84 Off Ramps met both screening criteria).

As Table 4.2-6 shows, the five selected intersection locations are as follows:

- Farmington Avenue and Laurel Street
- West Boulevard Avenue, Sisson Avenue, and I-84 Off-Ramps
- Hamilton Street and Bartholomew Avenue
- Boulevard Extended and I-84 Ramps (in Single Point Urban Interchange)
- Boulevard Extended and Hawthorn Street

4. In the event of overlap (i.e., some of the intersections selected in Steps 2 and 3 were the same), professional judgment was used to determine if any of the remaining intersections in the inventory warrant modeling. This decision was based upon such criteria as LOS/delay, geographic distribution of the modeled areas, etc., and would be justified in the preliminary recommendation. No additional locations were added, based on this step.

Table 4.2-6
Intersections Evaluated During Steps 2 and 3 of Screening Process

Intersections	Peak Hour	Existing	2020 No-Build			2020 Build			Screening Conditions Met
		LOS	LOS	Traffic Volume	Avg. Delay (sec.)	LOS	Traffic Volume	Avg. Delay (sec.)	
Farmington Ave. and Laurel Street	AM	B	C	2290	31.9	D	2240	36.7	High Delay
	PM	D	D	2875	43.6	E	2875	66.5	
W. Boulevard Ave. and Sisson Ave./I-84 Off Ramps	AM	F	F	3930	205.5	D	3035	48.9	High Delay & High Traffic Volume
	PM	F	F	4035	121.8	E	3325	69.1	
Flatbush Ave. and I-84 Ramps/Community Place	AM	C	C	2170	26.3	C	2020	28.6	
	PM	D	C	2595	21.7	B	2265	18.4	
Hamilton Street and Bartholomew Ave.	AM	B	B	1150	16.8	C	1445	22.6	High Delay
	PM	B	B	1210	17.2	F	2075	111.8	
I-84 EB On Ramp and Bartholomew Ave.	AM	-	-	-	-	B	1900	16.2	
	PM	-	-	-	-	C	2030	21.1	
I-84 WB On Ramp and Bartholomew Ave.	AM	-	-	-	-	C	1575	24.8	
	PM	-	-	-	-	C	2110	31.6	
Boulevard Extended and I-84 Ramps	AM	-	-	-	-	C	3950	28.6	High Traffic Volume
	PM	-	-	-	-	C	4050	28.8	
Boulevard Extended and Hawthorn St.	AM	-	-	-	-	B	3200	14.0	High Traffic Volume
	PM	-	-	-	-	C	3650	21.4	
Boulevard Extended and Laurel St.	AM	-	-	-	-	B	1860	19.2	
	PM	-	-	-	-	B	1995	15.5	

Table Legend:

High Delay	
High Traffic Volume	
Both High Delay and High Traffic Volume	

5. Professional judgment was used to account for decisions where a second intersection is in close proximity (less than 1000 feet) to a critical intersection. It could be warranted to model a second proximate intersection that would not ordinarily be selected because of its possible contribution to emissions from the first critical intersection. Two additional intersections were added because of their proximity to the five intersections selected. Table 4.2-7 lists the seven intersections, broken into four groups that were selected for air quality modeling analysis. The locations of these intersections within the study area are shown in Figure 4.2-1.

Traffic volumes, speeds, turning movements, and signalization data were used in the dispersion modeling analysis. Maximum CO concentrations were modeled for sensitive locations (receptors) in the vicinity of the four intersection groups that were analyzed. Sensitive receptor locations can include local residences, businesses, schools, health care facilities, and other locations where the general public has reasonable access. In addition to sensitive receptor locations representing specific structures or land uses, CO concentrations at intersections are estimated for receptors placed along the roadway shoulder or sidewalk area along the approaches to the intersection and the departures from the intersection. In accordance with EPA's 1992 guidelines, these "sidewalk" receptors were modeled at distances of 3 meters (10 feet), and 25 meters (82 feet), along the roadway's approach and departure beginning at the marked stop line, outside of the mixing zones of the free-flow roadway links being modeled.

Table 4.2-7
Intersections Modeled For Air Quality Impacts

Intersection	Town/City
Group 1: Farmington Avenue and Laurel Street	Hartford
Group 2: Hamilton Street and Bartholomew Avenue	Hartford
Group 3: West Boulevard Avenue and Sisson Avenue Sisson Avenue and Capitol Avenue	Hartford
Group 4: Boulevard Extended and Hawthorn Street Boulevard Extended and I-84 Single Point Urban Interchange Ramps Boulevard Extended and Laurel Street	Hartford

Because Group 4 is in close proximity to the I-84 mainline, the emissions from mainline traffic were included in the analysis in this area. Motor vehicle exhaust emission factors for CO, which are input into the dispersion model, were developed using EPA's MOBILE5b emission factor program in accordance with DEP guidance. The MOBILE5b input parameters for the study were chosen in accordance with current DEP requirements. Modeling took into consideration the National Low Emission Vehicle (NLEV) program recently adopted by DEP. The major MOBILE5b input parameters were either national defaults or values specific to conditions in Connecticut. Modeling assumed wintertime (January) conditions, which would be worst-case for CO.

One-hour CO concentrations were modeled using EPA's CAL3QHC Version 2.0 dispersion model. The eight-hour CO concentrations were then calculated from the one-hour results using a persistence-factor of 0.6 as recommended by DEP. (This takes into account the fact that worst-case meteorological conditions are not expected to persist for a full eight-hour period). The modeled one- and eight-hour CO concentrations were then added to their respective one- and eight-hour ambient background concentrations to get a total maximum CO concentration for each receptor location. The background values represent ambient levels independent of the intersection analyzed; worst-case values for all analysis years and study alternatives were used as per DEP guidance: 5.0 parts per million (ppm) for one hour and 3.0 ppm for eight hours. The estimated total maximum CO concentrations were then compared to the NAAQS presented in Table 4.2-1.

The estimated maximum one- and eight-hour CO concentrations for the receptors with the highest CO levels at each of the seven intersections are shown in Table 4.2-8. Under the Build Alternative in 2020, the highest one-hour concentrations were estimated to range from 6.3 to 8.3 ppm and the highest eight-hour concentrations were estimated to range from 3.8 to 5.0 ppm. For existing conditions, the highest one- and eight -hour CO levels of 12.9 and 7.7 ppm, respectively, were predicted for a sidewalk receptor 3 meters from the marked stop line of West Boulevard Avenue and Sisson Avenue. These CO levels are well below their corresponding one- and eight-hour standards of 35 and 9 ppm, respectively.

Table 4.2-8
Summary of Maximum Estimated CO Concentrations (in parts per million)*

Group	Intersection	2000 Existing		2020 No-Build		2020 Build		NAAQS	
		1-hr	8-hr	1-hr	8-hr	1-hr	8-hr	1-hr	8hr
1	Farmington Avenue and Laurel Street	7.0	4.2	6.3	3.8	6.3	3.8	***35.0***	***9.0***
2	Hamilton Street and Bartholomew Avenue	6.3	3.8	5.7	3.4	6.4	3.8		
3	West Boulevard Avenue and Sisson Avenue	12.9	7.7	7.7	4.6	8.3	5.0		
	Sisson Avenue and Capitol Avenue	11.8	7.1	7.7	4.6	7.7	4.6		
4	Boulevard Extended and Hawthorn Street	--	--	--	--	7.4	4.4		
	Boulevard Extended and I-84 Single Point Urban Interchange Ramps	--	--	--	--	7.4	4.4		
	Boulevard Extended and Laurel Street	--	--	--	--	6.3	3.8		

*Traffic volumes and intersection performance reflected the worst-case Build Options, either in the AM or PM Periods

CO concentrations in the study area intersections are expected to decrease in 2020 when compared with their corresponding levels in 2000. Even though traffic volumes are expected to

increase between 2000 and 2020, this increase is more than offset by decreases in motor vehicle exhaust emission rates that are mandated by the Federal Motor Exhaust Emissions Control Program. Consequently, the 2020 CO levels are lower than their 2000 counterparts. The highest one- and eight-hour CO concentrations for the Build Alternative, reported at the West Boulevard Avenue and Sisson Avenue intersection, are 8.3 and 5.0 ppm, respectively. These levels are well below their corresponding 35 and 9 ppm standards. The No-Build results are roughly the same as the levels for the Build Alternative, and no exceedances of the CO standards are expected anywhere.

Region-wide (mesoscale) impacts of the build condition on air quality were evaluated as part of the Hartford West MIS process. The analysis looked at Volatile Organic Compounds (VOC) and nitrogen oxides (NO_x), both of which are precursors of ozone. The MIS analysis indicated that at a regional level in the year 2020, VOC emissions would decrease from 1,340 kilograms per day in the No-Build alternative to 1,320 kilograms per day with the Hartford West improvements, a net decrease of 20 kilograms per day, or 1.5% reduction. For NO_x, regional emissions would decrease in 2020 from 4,520 kilograms per day in the No-Build Alternative to 4,410 kilograms per day with the busway, a net decrease of 110 kilograms per day, or a 2.4% reduction.

4.2.3 Mitigation of Impacts on Air Quality

All estimated CO concentrations are less than the NAAQS for the Build and No-Build Alternatives. No adverse air quality impacts would be expected due to implementation of the West Side Access Study Build Alternative. Therefore, the Build Alternative would conform to the SIP. Furthermore, no mitigation measures would be required for potential air quality impacts.

4.3 Land Use and Zoning

4.3.1 Affected Environment

The study area for land use and zoning analysis for the West Side Access Study is located within the red boundary line in Figure 1.3-1, between the Sigourney Street interchange in the Asylum Hill neighborhood of the City of Hartford and the Trout Brook Drive interchange area in the Town of West Hartford. It includes five defined neighborhoods within the City of Hartford – Asylum Hill, West End, Parkville, Frog Hollow and Behind the Rocks – and the Elmwood neighborhood within the Town of West Hartford.

The location of the Park River, the Amtrak rail line and I-84 have shaped the development pattern of the study area. The low-lying land along the Park River was not initially considered desirable for residential development. In the second half of the 19th Century, urban development spread from Hartford's downtown core into the Asylum Hill, Frog Hollow and Behind the Rocks neighborhoods, along the route of the then-New York, New Haven and Hartford Railroad line. Development also spread along Farmington Avenue and Park Street, where early trolley lines spurred the Hartford region's first wave of suburban residential development. In the early 1900's, multi-story factories were built along the rail line, producing, among other things, bicycles, typewriters, machine tools, and firearms.

Due to basic economic shifts in the 1970's and 1980's, many of the manufacturing companies that once occupied these buildings are no longer in business. Similarly, the solidly built housing that once typified the neighborhoods surrounding these factories began to decline, as regional patterns for new industry and residential development shifted to the surrounding suburbs and further west into the Farmington Valley.

As one of the key elements in the revival of these neighborhoods, the Capitol Region Council of Governments (CRCOG) and Connecticut Department of Transportation (ConnDOT) have supported a New Britain - Hartford Busway. The proposed busway corridor utilizes the Amtrak rail right-of-way through the West Side Access study area. The busway project would provide unique opportunities to serve currently underserved transit needs, such as the needs of reverse commuters (individuals who reside in or close to downtown Hartford and need to commute to jobs in outlying areas). This is particularly important for "welfare-to-work" programs. The busway would also improve access to educational institutions, both within and outside the West Side Access study area, such as Central Connecticut State University, University of Connecticut Medical Center, Hartford Public High School, and Trinity College.

The development of busway stations is expected to be a catalyst for sustainable redevelopment along the corridor as improved access increases the attractiveness of the corridor for transit-oriented residential, commercial, and office development.

In 1998, CRCOG and the City of Hartford were one of only 34 communities nationwide to receive project funding under the newly-created Transportation and Community Systems Preservation (TCSP) program of the Federal Highway Administration (FHWA). CRCOG and the City submitted a proposal to engage the public in a discussion of sustainable development, and to develop a guidebook of best practices and tools used by other communities to promote sustainable development. The project is currently underway. In Parkville, the TCSP project has been fully integrated into transportation planning for the area, both for the busway and Westside Access Build Alternative.

Land Use in Asylum Hill/West End

Each of these neighborhoods can be characterized as urban, with medium to high density housing. Housing types range from single-family homes to three-deckers, "perfect six" apartment buildings, and larger multi-family structures. These neighborhoods also contain major regional institutions and employment centers, as profiled in the following section, and illustrated in Figure 4.3-1. While the regional access provided by I-84 is generally beneficial to major commercial property owners, such as the office buildings owned by Aetna and other major insurance companies, the commuter traffic generated by these uses and by the highway entrances and exits which serve them are not conducive to surrounding residential areas.

Asylum Hill is the most diverse of the study area neighborhoods, in that it contains a number of major regional institutions and employers which are located at the periphery of downtown, such as the Aetna, ITT Hartford, and Massachusetts Mutual insurance company offices; St. Francis

Medical Center on Asylum Avenue; and also a wide range of housing types and conditions. The Asylum Hill area has the largest number (1,143) of condominium units found in the city.

The West End neighborhood is generally more protected from the detrimental effects of regional expressways, since it is further removed from I-84, and is screened from the highway right-of-way by Hartford High School and city park lands. This relatively affluent residential neighborhood is home to Hartford Divinity School, the University of Connecticut Law School, and Hartford College for Women. Farmington Avenue, the retail heart of the generally stable West End community, also provides a major travel route for commuters and is lined by both neighborhood shopping and solid, well-maintained apartment buildings, including the recently rehabilitated Clemens Place complex of condominium apartments. Within the West End, stately older homes mix with professional offices and more modest single-family housing.

The *Asylum Hill Neighborhood Strategic Plan for Revitalization*, issued in 1995, called for the revitalization of the commercial area along Farmington Avenue. To date, individual investments by merchants and community activists have been the most significant source of renewal in this neighborhood, including the renewal of a local bowling alley and plans for the re-use of the Capitol Theater.

Zoning in Asylum Hill/West End

Many portions of the West End and Asylum Hill neighborhoods are zoned for mixed use (Category RO-1 Residence Office District), as shown in Figure 4.3-1. Properties fronting on Farmington Avenue, Park Street, Prospect Avenue and several portions of New Britain Avenue are also zoned for general commercial (Categories B-3 and B-4). In the West End, some residential areas are classified for single-family residential development (Categories R-7 and R-8), while the Asylum Hill area is zoned for medium density residential use (Categories R-3 and R-4). These categories permit a level of residential density that is comparable to the high-density category in other study area communities. The industrial areas along I-84 and the railroad right-of-way are generally zoned for commercial development (Category C-1), with only a few blocks zoned for industrial use (Category I-2). It should be noted that most structures within these neighborhoods predate the application of zoning, so that existing uses do not always conform to current zoning categories or requirements.

Land Use in Frog Hollow/Parkville/Behind the Rocks

Frog Hollow, Parkville, and Behind the Rocks are all characterized by dense, multi-family housing stock (including three-deckers, “perfect sixes”, and larger multi-family buildings); very low per capita income -- below $10,000; a higher than average proportion of female-headed households; and low rates of auto ownership -- especially in Frog Hollow, where more than half the households do not have a vehicle. Park Street is the major commercial street serving this area, while New Park, Capitol and Flatbush avenues contain a mix of auto-oriented “big box” commercial developments, some housing (especially on Capitol Avenue), and various industrial plants and storage/distribution facilities.

Heavy volumes of both commuters and commercial (truck) through-traffic along New Park Avenue, Flatbush Avenue and other access routes to I-84 diminish the residential quality of life in all three neighborhoods.

The Frog Hollow, Parkville and Behind the Rocks neighborhoods form the core of Hartford's substantial Hispanic community. Together they have a population of nearly 30,000, of which just over half are Hispanic. The Parkville area takes great pride in its multi-ethnic heritage, including significant Portuguese, Southeast Asian, and Eastern European communities. The ethnic orientation of the Park Street retail strip has given it a new vitality, and individual merchants have invested in substantial rehabilitation of their storefronts. Pope Park, located at the junction of all three neighborhoods, is a major regional asset.

Deteriorated and obsolete housing in the Charter Oak Terrace and Rice Heights areas was recently demolished. The Hartford Housing Authority is awaiting HUD approval to construct a 300,000 square foot community-serving shopping center on the 55-acre Charter Oak site.

A new Super Stop & Shop opened recently in the Parkville area at the site of a former manufacturing plant. The supermarket is located on New Park Avenue in the vicinity of the I-84 Flatbush Avenue interchange. Much of the store's traffic comes from neighborhood shoppers who rely on local streets, bus and pedestrian access.

The building stock within the industrial area consists primarily of multi-story industrial loft buildings constructed at the beginning of the twentieth century. A number of these buildings are completely or partially vacant, while others have been adapted for multiple-tenant occupancy, warehousing/storage or non-manufacturing use. The recent trend has been for the re-use of industrial spaces by "creative industries", such as graphic designers, artists, etc.

In the Parkville Industrial Area (along New Park Avenue, from Francis Street north to Park Street), there are over 1,100 industrial and service jobs. Much of the parking supply in this area is free, and several employers have expressed concern that there is a shortage of employee parking.

The privately owned rental housing in the Frog Hollow, Parkville and Behind the Rocks areas is older than the citywide average, and it is more likely to be overcrowded. In Frog Hollow, in particular, a substantial portion of the population in this area (18 percent) lives in housing with more than one person per room. Ongoing concerns include, absentee housing ownership and housing abandonment.

Vacant, abandoned apartment buildings continue to be demolished, and infill housing, usually single-family or two-family houses, is being built in their place. Sites that have been vacant for years are being purchased, and small non-profit and for-profit developers are becoming interested in some opportunities for rehabilitation of small (6-unit or smaller) buildings in Parkville and Frog Hollow.

Several non-residential projects have also begun to revitalize these neighborhoods. The Real Art Ways Theater building forms the core of this community's revival. The Parkville Revitalization

Association is completing a study of the Parkville Industrial Corridor with recommendations for future development. Through the TCSP study program, the Parkville neighborhood is focusing on its transportation and land use issues. The community is exploring design standards to encourage pedestrian activity, including setbacks and lighting, for implementation along Park Street.

Crown Theatres, is a new 16-screen movie theater complex, located on the east side of New Park Avenue at Merrill Street. This is the first new movie theater to open within the city in many years. The other major redevelopment initiative is the Learning Corridor adjacent to Trinity College on Washington Street – an educational complex consisting of four new schools within a square-block campus – which opened in September 2000.

Zoning in Frog Hollow/Parkville/Behind the Rocks

The Frog Hollow, Parkville and Behind the Rocks neighborhoods are predominantly zoned for medium-density residential use (Categories R-3 and R-4). Park Street and portions of New Park Avenue and New Britain Avenue are zoned for neighborhood commercial use (Categories B-3 and B-4). Several large parcels along the railroad right-of-way are zoned for industrial use (Category I-2).

Land Use in Elmwood

The Elmwood neighborhood in the Town of West Hartford is generally defined as the area south of I-84 and east of Trout Brook Drive and Newington Road. This area is one of the most diverse within West Hartford. It contains a mix of both multi-family and single-family residences, along with the Chandler Evans manufacturing plant, and the West Hartford Place retail development on New Park Avenue. This "big box" oriented retail center, constructed in 1993, includes the new Home Depot store, as well as a second big box store and a 22,000-square foot free-standing retail building. Trout Brook Common, a 146-unit senior community development, would be completed in the next year on a site facing Quaker Lane.

A large number of neighborhood-oriented retail stores and auto-service businesses are also located along New Park Avenue. The Elmwood Community Center and the Elmwood Senior Center are located in this neighborhood, but serve residents throughout the West Hartford community.

The southeastern portion of West Hartford located south of the Amtrak railroad embankment has also been identified as the Elmwood area. This section is a mixed residential-manufacturing zone, with heavy commercial and auto service businesses becoming more predominant. The main Colt Industries manufacturing plant is located in this area. Colt is now the town's second largest employer, after the University of Hartford. Wiremold, Danaher Tool Group and the Abbottball Company are located here as well.

In terms of its demographics, the Elmwood area is one of the less affluent portions of West Hartford, and contains a greater degree of ethnic diversity as well. Private homes in this area tend to be smaller and more affordable than those elsewhere in West Hartford. An influx of

younger Hispanic, African-American and Asian American families has been noted in this area over the last five years.

The *West Hartford Plan of Conservation and Development: 1997-2010* outlined a policy goal to "Establish and maintain a safe, pleasant and functional environment in the Town's commercial and industrial areas while encouraging economic development." Recommendations included:

- Evaluate the enhancement of existing commercial streetscapes and implementation of a comprehensive streetscape design.
- Provide incentives to encourage reinvestment and upgrading the design and aesthetic appeal of properties in the older commercial and industrial districts."

Several policy recommendations supported increased densities near the potential busway transit stations. For example, the plan recommended, "that a Precise Planning Study be undertaken to evaluate the benefit and feasibility of permitting residential uses in the upper floors of buildings located in the commercial/business districts of… Elmwood Center… Permitting residential uses in the upper floors creates a sense of community and an 'urban neighborhood' environment." The plan also calls for rezoning of the industrial areas at both station sites from Industrial Park to General Industrial to allow denser development.

Town officials have recently emphasized that the Town's goal for the Elmwood neighborhood is to preserve its "tight, urban character" and to discourage cut-through traffic along lower level residential streets, such as Grove Street, and to reduce the impact of the I-84 on-ramps located in Elmwood. As examples of this approach, these officials have noted the recent traffic calming and design initiatives on Asylum Avenue and on St. Charles Street, which have substantially reduced the volume of through traffic in residential areas, as well as the average speed of traffic.

West Hartford recently adopted the Traditional Neighborhood Design District (TNDD) classification to New Britain Avenue in the vicinity of the proposed Elmwood busway station. The community has undertaken sidewalk enhancements, installed brick retaining walls, and improved street lighting in support of this zoning. At station area meetings, residents have expressed the view that the station would provide a tie-in to these street improvements and would enhance the pedestrian environment.

Zoning in Elmwood

The Elmwood area is zoned predominantly for single-family residential development (Category R-6), with several sections zoned for multi-family use (Categories RM-1 and RM-3). The industrial areas adjacent to the railroad right-of-way are zoned for either restricted or general industrial use (Categories IR and IG, respectively).

4.3.2 Environmental Consequences

Generally, land use impacts associated with a transportation program are considered to fall within two categories:

1. Primary impacts are associated with the condemnation of property or with significant changes to access that affect the current and future value of a property, or strongly influence a change in use of a property.

2. Secondary impacts (or neighborhood impacts) involve the influence that transportation access can have to spur or retard further economic development within a larger adjacent area.

This categorization has been used to identify the type and level of impact that would be associated with the two major modifications developed by the West Side Access Build Alternative.

Sisson Avenue Improvements

Primary Impacts

Because the relocation of highway structures and roadway realignment suggested within the West Side Access Build Alternative, impacts would occur primarily within existing highway right-of-way, and the primary environmental consequences for land use and zoning would be minimal.

The realignment of Sisson Avenue interchange and the extension of Hawthorn Street to the west would require the taking of approximately 3,000 square feet of property within the Hartford High School campus. This property is located at the southeast corner of the campus and was previously used for surface parking; see Section 4.11 for more information. The parcel that would need to be utilized for the Hawthorn Street extension is currently vacant and unused.

The build condition would have no direct impact on the future New Britain – Hartford Busway. The busway would pass under the new Boulevard Extended roadway.

Secondary Impacts

The revised access that would result from the Sisson Avenue realignment would be likely to enhance the value of adjacent commercial and institutional properties. In particular, the creation of an improved interchange connection to the Aetna campus from the west would be beneficial to the value and operation of this facility.

Flatbush Avenue Improvements

Primary Impacts

The tight configuration of the recommended interchange at Bartholomew Avenue minimizes the land acquisition required for this improvement. A limited amount of property taking may occur within the undeveloped portion of the Crown Theater property to the south of the existing elevated highway structure. Elevated on- and off-ramps to the I-84 eastbound mainline would be constructed in this area. Beneath this structure, new parking spaces can be developed to replace any parking area lost due to the roadway modifications. An additional area of property may be

required in the vicinity of the intersection of Bartholomew Avenue with the new eastbound ramp system.

The Build Alternative would have no direct impact on the future New Britain – Hartford Busway. The busway would pass under the I-84 eastbound and westbound mainlines, and the new eastbound off ramp to Bartholomew Avenue. The New Park Avenue (Kane Street) Station building and platforms would be immediately north of I-84 and station parking would be located below the freeway viaducts. The roadway modifications being considerd in the Westside Access Build Alternative would be compatible with station design.

Secondary Impacts

The creation of a full interchange with Bartholomew Street extended and improved access to Flatbush Avenue, in place of the existing partial interchange to Flatbush would significantly improve access to commercial and industrial properties located in the adjacent area, in particular the large-scale, mixed-use commercial development anticipated on the former Charter Oak and Rice Heights public housing sites.

The No-Build Alternative will not adversely impact socioeconomic effects or land use changes.

4.3.3 Mitigations of Land Use Impacts

The Build Alternative is not anticipated to have widespread adverse socioeconomic effects or land use changes. Effects would be limited where right of way would be acquired.

Relocation services would be offered to all displaced persons (owners and tenants) and businesses without regard to race, color or national origin in accordance with the Uniform Relocation and Real Property Acquisition Policy Act of 1970, as amended, and Connecticut PA 838. In cases where a partial property acquisition is required, or where a property is bisected, leaving an owner with an unusable portion of property, the state would monetarily compensate land owners for any land required or left uneconomically usable.

4.4 Wetlands

4.4.1 Affected Environment

Impacts upon wetlands are regulated by applicable state and federal statutes and orders, specifically Section 404 of the Clean Water Act (as amended), Executive Order 11990 (Protection of Wetlands), and Sections 22a-36 through 22a-45a of the Connecticut General Statutes (CGS).

The study area is heavily urbanized with few wetlands and surface water resources. Of those that are present, most are located in the vicinity of the Flatbush Avenue and Prospect Avenue interchanges with I-84. There are no wetlands or water resources associated with the Sisson Avenue interchange area other than a man-made detention basin located east of Laurel Street and south of I-84 on property occupied by the Park Towers apartment complex.

Wetlands that were identified in the field are shown in Figure 4.4-1 and are described below, along with associated surface water resources. The field review was based upon visual observation, and did not include a formal wetlands delineation, which would be performed during a design phase. Surface waters are discussed in greater detail in Section 4.5.

- Wetland #1 comprises two small linear patches of wetlands located between the existing Flatbush Avenue off-ramp and Industrial Drive to the west. The southern patch is an elongated narrow wetland dominated by a monoculture of *Phragmites* (reed grass). The northern patch (previously mapped by NWI as PUBH) is primarily *Phragmites*, with a mix of shrubs. Due to their small size, these wetlands have limited value. Their primary function is sediment/toxicant retention, serving a small role in purifying the runoff from the off-ramp.

- Wetland #2 is located to the east of the existing Flatbush Avenue on- and off-ramps, south of where they diverge. Wetland #2 is a large wet meadow, approximately 2.4 hectares (6.0 acres) in size. Between the on/off ramp and the channelized South Branch of the Park River, east of the ramps, is a gently sloping terrace that appears to be a wet meadow. Phragmites has infested the southern end, while the northern section is a more open meadow with a few shrubs. This is a broad area extending along the river, which is likely to be hydrologically influenced by the river, despite the river's channelized condition. Because this wetland receives roadway drainage as well as flood waters from the river, it carries out several functions, including floodflow alteration, nutrient removal, and sediment/toxicant retention. Because the vegetation in the area is managed/mowed and has a component of species with low habitat value, such as phragmites, its value for wildlife habitat is low.

- Wetland # 3 is an open area between the existing Flatbush Avenue on- and off-ramps, and is approximately 2.3 hectares (5.7 acres) in size. It is a mix of meadow and shrub wetlands, with *Phragmites*, grasses, other herbaceous species, and shrubs. Similar to Wetland 2, the primary functions of this wetland are floodflow alteration, nutrient removal, and sediment/toxicant retention.

Further to the north, Wetland #4 is a small wetland area associated with a stream tributary to Kane Brook, approximately 0.02 hectares (0.04 acres) in size. This diminutive area is basically a channel, which primarily serves to convey the watercourse. Vegetation along the banks may serve to retain sediment; otherwise, it carries out no wetland functions.

- Heading west, Wetland # 5 is a forested wetland associated with another tributary stream to Kane Brook that is located directly beneath the existing I-84 "Flatbush Curve" viaduct. Wetland 5 is approximately 0.1 hectares (0.2 acres) in size. This area is similar to Wetland 4 in that it basically serves to convey the watercourse, with a very small value for sediment retention.

- Wetland #6 is located to the west of the existing I-84 Flatbush Avenue off-ramp, east of the Amtrak rail corridor and southwest of the I-84 "Flatbush Curve" viaduct. This wetland is a forested wetland associated with Kane Brook, and is approximately 1.4 hectares (3.5 acres) in size. Because of the relatively greater size and its forest cover, this wetland carries out several

wetland functions, primarily floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat.

- On the northern side of I-84 between New Park Avenue and the Amtrak rail corridor is a small forested section of Kane Brook. Wetland #7 includes an area associated with the brook that would be classified as wetlands. The wetlands comprise an area approximately 0.08 hectares (0.2 acres) in size. While functioning primarily to convey the watercourse, this wetland has trees along the stream channel that provide some sediment retention and wildlife habitat values.

- There are two small wetland areas (#8 and 9) north of Hamilton Street in the vicinity of I-84 but beyond the limits of construction. Wetland #8 is located to the west of I-84, between the highway and an industrial access drive. Wetland #8 is a very small linear disturbed wetland dominated by *Phragmites*, within which some fill has been deposited. It is directly next to an active industrial yard. Although small, this wetland has an important function as a sink for toxicants and sediments from the immediately adjacent land uses.

- Wetland #9 is located east of I-84, and contains a wet meadow area between I-84 and the channelized South Branch of the Park River. Similar to Wetlands 2 and 3, the primary functions of this wetland are floodflow alteration, nutrient removal, and sediment/toxicant retention.

- Wetland #10 is a continuation of wetland area #7 and is associated with Kane Brook, west of New Park Avenue. It contains forested vegetation, and is located between New Park Avenue and Prospect Street. While the channelized length of this wetland functions primarily to convey the watercourse, the broader forested area also has some value for floodflow alteration, nutrient removal, and sediment/toxicant retention. Because this wetland is surrounded by roadways and intense urban development, its potential for wildlife habitat is low.

- Wetland #11 is forested wetland similar to wetland #10, and is located north of I-84 between Prospect Avenue and the I-84 westbound off-ramp to Prospect Avenue. Similar to Wetland 10, the channelized length of this wetland functions primarily to convey the watercourse, but the broader forested area has some value for floodflow alteration, nutrient removal, and sediment/toxicant retention.

- Wetland #12 is located north of I-84 at Interchange 44 and adjacent to the stream within the in-field of the Interchange 44 ramps. This wetland is dominated by emergent and shrub vegetation and is approximately 0.07 hectares (0.17 acres) in size. While functioning primarily to convey the watercourse, the vegetation enables this wetland to carry out some sediment retention and nutrient removal functions.

4.4.2 Environmental Consequences

In the vicinity of the Sisson Avenue single point urban interchange and associated roadway modifications, the only existing wetland documented is a man-made detention basin located east

of Laurel Street and south of I-84 on property occupied by the Park Towers apartment complex. This detention basin would not be impacted by the build condition.

Figure 4.4-1 depicts the wetlands and surface water resources located near the Flatbush Avenue and Prospect Avenue interchanges. Table 4.4-1 summarizes the anticipated impacts.

Table 4.4-1
Impacted Wetland Areas

Wetland Area	Estimated Total Area		Estimated Area of Impact	
	Hectares	Acres	Hectares	Acres
2	2.4	6.0	0.07	0.19
4	0.02	0.04	0.02	0.04
5	0.1	0.2	0.01	0.04
6	1.4	3.5	0.4	0.9
7	0.08	0.2	0.02	0.05
12	0.07	0.2	0.003	0.008
TOTALS	**4.07**	**10.14**	**0.52**	**1.23**

- Wetland #2: Approximately 0.07 hectares (0.19 acres) of the southwestern corner of this wetland may be impacted where the new Bartholomew Avenue Extension connects to Flatbush Avenue. At this location, the fill slope may encroach into the wetland and a culvert extension is also anticipated. The western border may be impacted by the fill slope associated with the new pedestrian connection which would be constructed along the east side of Bartholomew Avenue Extension.

- Wetland #4: Further to the north, a small wetland area associated with a stream tributary to Kane Brook would be completely impacted by the construction of the new on-ramp to I-84 eastbound. Approximately 0.02 hectares (0.04 acres) of wetland would be impacted.

- Wetland #5: Approximately 0.01 hectares (0.04 acres) of this wetland would be filled during construction of the new Bartholomew Avenue Extension. While impacts on this wetland could be minimized by reducing the extent of the fill slope, not all wetland impact in this area can be avoided, as the new roadway crosses directly over the northeastern tip of the wetland.

- Wetland #6: Approximately 0.4 hectares (0.9 acres) of the northern part of this wetland would be impacted by a new I-84 eastbound off-ramp to Bartholomew Avenue that would originate east of the Prospect Avenue overpass and parallel I-84 on its southern side. The off-ramp would cross New Park Avenue and the Amtrak rail corridor above-grade and then rapidly return to grade as it crosses this wetland and connects with Bartholomew Avenue Extension. The northwestern corner of the wetland would be impacted by the construction of permanent footings for the piers associated with the bridge carrying the off-ramp over the Amtrak rail corridor. The northeastern part of the wetland would be directly impacted by the off-ramp and associated fill slope.

- Wetland #7: The section of the I-84 westbound viaduct that crosses the Amtrak rail corridor and New Park Avenue would be widened in this area to accommodate an acceleration lane associated with the new I-84 westbound on-ramp from Bartholomew Avenue Extension. It is anticipated that no footings would be constructed within the limits of the Kane Brook forested wetland; however, a portion of the wetland approximately 0.02 hectares (0.05 acres) in size that is currently exposed to sunlight would be permanently shaded by the widening of the viaduct, resulting in an indirect impact.

- Wetland #12: A minor culvert extension would be needed on the north side of the I-84 westbound mainline. This would result in approximately 0.003 hectares (0.008 acres) of impact to wetlands in this area.

There are no other anticipated impacts on wetlands associated with the Flatbush Avenue interchange reconfiguration and associated roadway modifications.

A beneficial element of the Build Alternative would be the removal of a large section of the existing I-84 Flatbush Avenue on-ramp that currently separates two relatively large wetland areas (wetlands 2 and 3) located adjacent to the South Branch of the Park River. Some of the land area in the footprint of this on-ramp could be used to mitigate wetland impacts. Additionally, the removal of a portion of this on-ramp would enable a hydrologic connection to be reestablished between Wetlands 2 and 3.

Temporary impacts may occur adjacent to the permanent impact areas, associated with construction techniques or erosion and sedimentation (E&S) control measures. Where fill slopes are proposed, excavation of unsuitable materials at the toes of slope, and installation of fill, may be required. Once installed, however, the over-excavated areas can be regarded and restored as wetlands. Where culvert replacements are necessary, temporary impacts from establishing water handling measures or installing E&S controls, such as check dams and silt fencing, may occur. After completion of the work and removal of the controls, however, the sites will be brought back to existing conditions. Temporary impacts, therefore, are anticipated to be minor in scale and effect.

The No-Build Alternative would not create any impacts on wetlands.

4.4.3 Mitigation Measures

As noted above, the removal of the existing Flatbush Avenue on-ramp would offer opportunities to re-connect two wetland areas that have been separated by the existing on-ramp. Wetlands 2 and 3, which currently are 2.4 hectares (6.0 acres) and 2.3 hectares (5.7 acres) respectively, would be joined together by 1.6 hectares (3.9 acres) of new mitigation area. Since wetland 2 would also experience a minor impact, the total combined wetland area comprising wetlands 2, 3 and the mitigation area would be 6.2 hectares (15.4 acres) in size.

At wetlands # 1, 2, 3, and to a lesser degree, #5, limiting the extent of the fill slope by either utilizing a steeper-than-usual slope or by constructing a retaining wall could minimize impacts on these wetlands or avoid impacting them altogether.

Any permanent loss of wetlands from the Build Alternative would be compensated through a comprehensive wetland mitigation plan that would be formulated in cooperation with the appropriate regulatory agencies (Army Corps of Engineers and/or Connecticut DEP). Mitigation would emphasize the replacement of the functions and values of the impacted wetlands, within the watershed where impacts occurred (Piper Brook.) Construction impacts and long-term impacts related to increased runoff, erosion, and sedimentation would be mitigated through the drainage design and stormwater pollution prevention plan, which would incorporate BMPs both during and post-construction.

4.5 Surface Waters

4.5.1 Existing Conditions

The following surface water resources are found in the study area and were also pictured in Figure 4.4-1:

North Branch of Park River at Farmington Avenue, Hartford: North of Farmington Avenue, the North Branch of the Park River is free-flowing, flowing south. It becomes piped (underground) behind (north of) an apartment building complex on the north side of Farmington Avenue, just west of Woodland Street. From there, the river is conveyed underground in a southeasterly direction, under the Hartford High School site and under the Sisson Avenue I-84 Interchange. East of Interchange 46, the North Branch continues in an underground conduit and joins the South Branch of the Park River underground to form the Park River. The Park River flows toward the east and north in a conduit.

South Branch of the Park River, Hartford: The South Branch is channelized in concrete and sheet piling for most of its length between Park Street and Flatbush Avenue. There is visual evidence that the river occasionally or frequently runs higher than the constructed sidewalls, as there is erosion/slumping of the soils and tree roots located above the walls. At those times, the adjacent lands are subject to inundation. There are several piped discharges to the river from the east that appear as short stream segments on study area mapping.

Kane Brook (Tributary to South Branch of Park River), West Hartford and Hartford:, Kane Brook follows a path from the vicinity of Prospect Avenue, and runs generally parallel with I-84 until it joins the South Branch of the Park River. Forested wetlands run along the brook all the way to the railroad embankment (under the I-84 viaduct), where the brook is conveyed southerly through culverts. South of I-84, there is a broader forested wetland area associated with the stream, west of the I-84 off-ramp to Flatbush Avenue. Easterly, a few small forested wetland patches remain underneath the I-84 "Flatbush Curve" viaduct, including segmented stream sections on their way to their ultimate confluence with the South Branch of the Park River.

Saint Joseph's Brook, West Hartford: This tributary to Kane Brook runs in a generally northwest to southeast direction from the vicinity of Park Road in West Hartford through Saint Joseph's Convent, across Prospect Avenue, under Kane Street, and into Kane Brook. Much of the portion between Prospect Avenue and Kane Street is in an underground conduit. Town of West Hartford

staff has indicated that the conduit is undersized and creates flooding problems upstream in the convent.

Open Water Pockets on West Side of Industrial Drive, Hartford: North of Flatbush Avenue and west of Industrial Drive are three very small open water pockets within previously disturbed industrial property, and a drainage ditch that loosely connects them, running north-south. Discoloration and turbidity of the water in the pockets indicate poor water quality.

4.5.2 Environmental Consequences

At the northern end of the wet meadow located between the existing Flatbush Avenue on- and off-ramps (Wetland #3 as described in section 4.4.1), Kane Brook flows eastward towards the South Branch of the Park River. The roadway configuration in this location would include a new I-84 eastbound on-ramp to be constructed from Bartholomew Avenue Extension. A new pedestrian connection paralleling the east side of Bartholomew Avenue Extension would also be accommodated in this location. Approximately 187 feet of Kane Brook would be impacted by a culvert extension required in this area.

An important feature that would need to be avoided during a design phase of the Sisson Avenue interchange improvements is the underground conduit that conveys the north branch of the Park River from the northwest to the southeast. This underground conduit passes directly beneath the existing Sisson Avenue ramps and I-84 viaduct. An accurate survey of its location should preclude potential impacts altogether.

The No-Build Alternative would not create any impacts on surface waters.

4.5.3 Mitigation Measures

Potential impacts during the construction period and long-term impacts to water quality associated with increased runoff, erosion, and sedimentation would be mitigated through the drainage design and a stormwater pollution prevention plan, which would incorporate BMPs both during and post-construction.

4.6 100-Year Floodplains and Floodways

4.6.1 Affected Environment

Digital National Flood Insurance Rate Maps (FIRM) were obtained from the University of Connecticut MAGIC website to identify 100-year floodplain and floodway locations within the study area. The digital mapping was taken from the Hartford Flood Insurance Rate Map (FIRM), which dates from 1986, and the West Hartford FIRM, which dates from 1991.

Within the study area, designated 100-year floodplain areas are limited to Kane Brook and the South Branch of the Park River. There are no 100-year floodplain areas in the vicinity of the Sisson Avenue interchange reconfiguration and associated roadway improvements. Floodplain areas are depicted on Figure 4.6-1.

There are three locations where the designated 100-year floodplain appears to be directly impacted by the proposed Flatbush Avenue interchange improvements, shown in the figure:

- Area 1: Just west of the existing I-84 Flatbush Avenue off-ramp, east of the Amtrak rail corridor and southwest of the I-84 "Flatbush Curve" viaduct is an area of 100-year floodplain associated with Kane Brook.

- Area 2: To the east of this location, in the area between the existing on- and off-ramps, is a smaller area of designated 100-year floodplain associated with Kane Brook.

- Area 3: The Build Alternative includes the construction of a multi-use trail (presumably asphalt) along the eastern side of the South Branch of the Park River. The trail, located on Hartford Flood Control property, would extend from Flatbush Avenue north to Hamilton Street.

It should be noted that there have been land use changes that have come subsequent to the dates that the floodplains were mapped. For example, the razing of the Rice Heights housing development has likely reduced the area of impervious surface within the watershed of the South Branch of the Park River. Subsequent flood flow determinations would be necessary to determine the extent of floodplains under current conditions.

4.6.2 Environmental Consequences

The extend of 100 year floodplain volume associated with Kane Brook that would be impacted by fill or by the toe of fill slope, can not be formally quantified until a design phase. However, due to the certain placement of fill within the floodplain, Flood Management Certification by the CTDEP would be required.

Preliminary estimates of impacted floodplain area are as follows:

- Area 1: Approximately 1.2 hectares (3.0 acres) of this floodplain would be filled by the construction of the new I-84 off-ramp that originates east of the Prospect Avenue overpass and parallels I-84 on the south before connecting to Bartholomew Avenue Extension.

- Area 2: Approximately 0.4 hectares (0.9 acres) of the floodplain would be impacted by the toe of fill slope associated with the pedestrian connection paralleling Bartholomew Avenue Extension as well as from the fill slope associated with the new on-ramp to I-84 eastbound in this location.

- Area 3: It appears that most of the trail would be constructed above the designated 100-year flood elevation, however, there appear to be a few isolated locations along the route where encroachment into the floodplain is unavoidable. Approximately 1.0 hectares (2.5 acres) of 100-year floodplain impact is anticipated.

The No-Build Alternative would not create any impacts on Floodplains.

4.6.3 Mitigation Measures

Floodplain encroachment would warrant carrying out mitigation. Measures could include, a compensatory flood storage plan, and/or flood-proofing measures for existing structures. Coordination with DEP would take place during final design in this regard.

4.7 Groundwater Resources

4.7.1 Affected Environment

No public or community water supply sources or watersheds exist within the Study Area (Connecticut Department of Environmental Protection Atlas of Water Supply Sources). The Study Area, however, is underlain by a large stratified drift aquifer, which acts as a large underground water reservoir. The DEP (DEP Water Quality Classifications for Connecticut River and South Central Coastal Basins, 1993) has classified the groundwater quality as GB, such that it is unsuitable for consumption. The aquifer is not used for public water supply, nor is it classified as a potential high yield aquifer or potential water supply watershed (DEP Water Supply Resources Map, 1996)

4.7.2 Environmental Consequences

There would be no adverse impacts to Level A or Level B Aquifers, Aquifer Protection Zones, Sole Source Aquifers, Public Drinking Water Wellhead Protection Zones, Potential Wellfields, or Class I or Class II Water Company Lands from either the Flatbush Avenue or Sisson Avenue interchange concepts. The entire study area resides within the Metropolitan District Commission (MDC) Community Water Service area. Local groundwater resources are not used as a source of drinking water or for industrial purposes. A groundwater monitoring well located west of the existing Flatbush Avenue off-ramp would not be impacted by the new configuration of the Flatbush Avenue interchange.

The No-Build Alternative would not create any impacts on groundwater resources.

4.7.3 Mitigation Measures

Mitigation for decreased infiltration to groundwater (stratified drift aquifer) may be possible by maximizing retention and infiltration in the drainage design.

4.8 Threatened and Endangered Species

4.8.1 Affected Environment

The CTDEP *State and Federal Listed Species and Significant Natural Communities Map* (Hartford Quadrangle) dated July 27, 2000, and the December 1999 GIS coverage entitled, *Generalized Locations of Listed Species and Significant Natural Communities* were consulted to

determine the presence and/or absence of endangered, threatened or special concern species and significant communities within the study area.

Information requests have been submitted to both the CTDEP Natural Diversity Database and the U.S. Fish and Wildlife Service (USFWS). In a letter from DEP dated 7/26/01 they indicated that the Natural Diversity Data Base maps and files no known extant populations of Federal or State Endangered, Threatened or Special Concern Species occur in the West Side Access study area.

The No-Build Alternative would not create any impacts on Threatened or Endangered species.

4.8.2 Environmental Consequences

The Build Alternative is expected to have no effect on Threatened and Endangered species, since no known species are found in the corridor.

4.8.3 Mitigation Measures

No mitigation of impacts on Threatened or Endangered species would be necessary.

4.9 Farmland Soils

4.9.1 Affected Environment

Digital NRCS soils maps for Hartford County (1962) obtained from the University of Connecticut MAGIC website were utilized to identify Prime and Statewide Important Farmland Soils within the study area. These areas of farmland soils are depicted in Figure 4.9-1. Aerial photographs from 1990 were overlain with the digital inventory of farmland soils to identify undeveloped Prime and Statewide Important farmland soil areas since the potential benefit of farmland soil is lost once developed.
Only two undeveloped Prime Farmland soil areas were identified. An area of Elmwood Fine Sandy Loam with 0 to 3 percent slopes is located along the western boundary of the study area south of Park Street, west of Prospect Street and east of Ringold Street. This area is approximately 0.9 hectares (2.23 acres) and is completely surrounded by development. The other area of Prime Farmland soils is located along the eastern boundary of the study area within Pope Park north of Hamilton Street. This area is approximately 2.20 hectares (5.43 acres) and is comprised of Elmwood Fine Sandy Loam with 3 to 8 percent slopes.

Four small areas of Statewide Important Farmland soils are located along the eastern edge of the study area. Three are located within Pope Park and the fourth is located just east of the Park Towers. All four areas are comprised of Wethersfield Loam with 8 to 15 percent slopes and cover a total area of approximately 1.93 hectares (4.76 acres). A fifth area of Statewide Important Farmland soils is located just north of the Capitol and east of the I-84 Capitol Avenue Interchange. This area is also comprised of Wethersfield Loam with 8 to 15 percent slopes and covers approximately 0.81 hectares (1.99 acres).

4.9.2 Environmental Consequences

There would be no adverse impacts to Prime Farmland Soils, Statewide Important Farmland Soils, or active farmland from either the Flatbush Avenue or Sisson Avenue interchange reconstruction. There are no active farms and only a few areas of undeveloped Prime and Statewide Important Farmland soils occur in the study area. These farmland soils are located well beyond the footprint of the interchange configurations.

The No-Build Alternative would not create any impacts to Prime or Unique Farmland.

4.9.3 Mitigation of Impacts on Prime or Unique Farmland

The Build Alternative would have no impacts on farmland, so no mitigation measures would be anticipated.

4.10 Cultural Resources (Section 106 Evaluation)

Section 106 of the National Historic Preservation Act of 1966 governs cultural resources (archaeological and historic resources) that are or may be eligible for the National Register of Historic Places. Section 106 requires federal agencies to avoid unnecessary harm to cultural resources as a result of projects that utilize federal funding. The State Historic Preservation Office (SHPO) oversees and participates in implementation of Section 106 regulations in Connecticut. The Advisory Council on Historic Preservation (ACHP), an independent federal agency, oversees Section 106 analysis at the federal level through coordination with the project proposers. "Adverse impacts" are not limited to direct alteration of a historic property, but could also include a change in the property's setting (if it contributes to qualification for the National Register of Historic Places), introduction of visual, audible, or atmospheric elements that alter the property's character or setting, neglect of the property, or a transfer, lease, or sale of the property. The National Register of Historic Places (NRHP) is the federal government's official list of cultural resources worthy of preservation, and has specific eligibility criteria.

To be eligible for the NRHP, properties must retain physical integrity and must be evaluated for historical, architectural, artistic, or archaeological significance. Specifically, NRHP criteria require that properties possess integrity of location, design, setting, materials, workmanship, feeling, and association. In addition properties must meet at least one of the following criteria:

- ***Criterion A:*** Be associated with events that have made a significant contribution to the broad patterns of our history, or

- ***Criterion B:*** Be associated with the lives of persons significant in our past, or

- ***Criterion C:*** Embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master, or possess high artistic values, or

- ***Criterion D:*** Yield or be likely to yield information important in history or prehistory.

4.10.1 Affected Environment

Figure 4.10-1 shows the cultural resources within the study area or in immediate visual proximity to the study area, including individual historic properties and historic districts. Table 4.10-1 summarizes the properties that are shown in the figure.

Table 4.10-1
Cultural Resource Properties on the National Register of Historic Places Identified in Study Area from SHPO Files

ID #	Property Name	Property Address
1	Lyman House (Town and Country Club)	22 Woodland Street
2	Mark Twain House	351 Farmington Avenue
3	Harriet Beecher Stowe House	73 Forest Street
4	Day House	36 Forest Street
5	Apartments at 49-51 Spring Street	49-51 Spring Street
6	Apartment at 39-41 Spring Street	39-41 Spring Street
7	Calvin Day House	105 Spring Street
8	Union Station	Union Place
9	Jud and Root Building	175-189 Allyn Street
10	Bushnell Park	--
11	CT State Capitol	--
12	CT State Library	231 Capitol Avenue
13	Saint Paul Methodist Episcopal Church	1886-1906 Park Street
14	House	36 Forest Street*
15	Hooker House	140 Hawthorn Street
16	Governor's Foot Guard Armory	360 Broad Street

*Address listed as 36 Forest Street is assumed to be incorrect in database due to the fact that the same address is associated with the Day House (Site #4)

In addition to these individual historic and architectural resources, four National Register historic districts exist wholly or partially within the West Side Access study area. These districts include:

- The Frog Hollow Historic District
- The West End South Historic District
- The West End North Historic District; and
- Asylum Hill – Laurel & Marshall Historic District.

There are a number of above-ground historic and architectural resources within the study area, including individual structures listed on or eligible for the National Register of Historic Places and two National Register Historic Districts; the Asylum Hill – Laurel & Marshall Historic District and the Frog Hollow Historic District (Figure 4.10-1). Both historic districts are located in close proximity to the Sisson Avenue single point urban interchange and associated roadway modifications. There are no historic districts in close proximity to the Flatbush Avenue interchange and associated roadway modifications.

The Asylum Hill – Laurel & Marshall Historic Districts are located north of Hawthorn Street and occupies much of the area bounded on the east by Sigourney Street, on the west by Laurel Street, and on the north by Farmington Avenue. The Frog Hollow Historic District is an extensive district that abuts I-84 in two locations in the vicinity of the Sisson Avenue interchange improvements.

The Amtrak corridor, which runs from New Haven to Hartford and on to Springfield bisects the study area and generally runs parallel to I-84. Amtrak was evaluated as part of the Draft Environmental Impact Statement for the New Britain – Hartford Busway (March, 2001). The Amtrak corridor is the oldest rail alignment in Connecticut, dating from about 1839. The New Britain – Hartford Busway project is expected to require the alteration of a number of Amtrak bridges and culverts, some of which are located within the Westside Access study area. The SHPO has not formally determined the eligibility of the Amtrak corridor, but has acknowledged it as a resource, and has requested mitigative measures in the form of photo and narrative documentation for some of its resources.

The most notable Amtrak resource in the West Side Access study area is a stone archway within the I-84 Sisson Avenue Interchange. The arch originally carried the tracks over the Park River before relocation of the Park River to an underground conduit. This structure, shown in Figure 4.10-2, would be altered by the New Britain – Hartford Busway project. For that project, SHPO has requested that ConnDOT will provide photographic and narrative documentation this structure, which would be removed and replaced with fill on the busway side, with the Amtrak portion remaining intact.

Figure 4.10-2
Amtrak Stone Arch Associated with Previous Alignment of Park River (Sisson Avenue Interchange Ramp Overhead)

4.10.2 Environmental Consequences

Based on the current plans, there are no individually listed historic resources that could be directly impacted by the Build Alternative. Several modifications would be provided along Hawthorn Street, including lane widening from a point just west of the Imlay/Hawthorn Street intersection westward along its entire length, an improved signalized intersection at the Laurel/Hawthorn Street intersection with additional turning lanes, and a complete realignment and extension of the western end of Hawthorn Street. These changes to Hawthorn Street in the vicinity of the Asylum Hill – Laurel & Marshall Historic District would result in minor strip takings along properties located north of Hawthorn Street between Imlay Street and Laurel Street, as well as minor strip takings along properties located on both sides of Laurel Street north of Hawthorn Street. No historic structures would be directly impacted (acquired) by these roadway modifications.

Section 106 consultation with SHPO has been undertaken. In a letter dated 8/20/01 SHPO concurs with the conclusion that these minor strip takings would have no impact on the Asylum Hill – Laurel & Marshall National Register Historic District.

The Frog Hollow Historic District is an extensive district that abuts I-84 in two locations in the vicinity of the Sisson Avenue interchange improvements. The northernmost portion of the district, located south of I-84 in the vicinity of Sigourney Street and Capitol Avenue, would not be impacted by construction associated with the reconfiguration of the Sisson Avenue interchange, as all construction would occur to the west of the district boundaries.

South of the existing Sisson Avenue interchange, a portion of the Frog Hollow Historic District would be approached by the I-84 eastbound off-ramp as I-84 crosses over Park Street associated with the new Sisson Avenue single point urban interchange. The above-grade ramp would pass behind the existing retail building (former Bradlees Store) located on the northwest corner of the Park Street/Laurel Street intersection and eventually connect with the new Boulevard Extended. All construction related to this off-ramp would be located to the north of Park Street, north of this portion of the Frog Hollow Historic District. Overall, the Sisson Avenue interchange reconfiguration would have no direct impacts on the Frog Hollow Historic District or any of its contributing structures.

Informal consultation with the Connecticut Historical Commission (CHC) and review of available CHC data has revealed that the study area has not been subjected to a comprehensive archaeological survey. Queries of the statewide archaeological database for this study indicated that no potentially significant archaeological sites have been reported within the study area. The reconfiguration of both the Flatbush Avenue and Sisson Avenue interchanges would occur predominantly within the existing I-84 right-of-way and, to a lesser extent, in adjacent developed areas. The soil profile in the study area was substantially disturbed during the original construction of the highway and more recently by development. The extent of soil disturbance in the area due to development activity greatly reduces the possibility of uncovering intact archaeological resources. Based on this information, the likelihood of impacting archaeological resources during construction is minimal.

The No-Build Alternative would have no effect on Section 106 resources.

4.10.3 Mitigation Measures

As a part of the Section 106 coordination for this evaluation, the SHPO was provided with detailed information about the Build Alternative and the historic and archaeological resources found within the Area of Potential Effect (APE). The SHPO determined that the Build Alternative would have "no effect" on any resources in the corridor governed by Section 106.

4.11 Section 4(f) and Section 6(f) Properties

Section 4(f) sites include public parks, recreation lands, wildlife and waterfowl refuges, and historic sites. Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) states that no highway project should be approved which requires the use of any publicly owned land from a public park, recreation area, wildlife and waterfowl refuge or historic site unless there is no feasible or prudent alternative to the use of such land. In addition, adverse impacts to these sites must include all possible planning to minimize harm resulting from such use. The Section 4(f) evaluation provides facts about each site to help determine whether there are feasible/prudent alternatives to the use of the site and to identify measures to minimize harm.

Section 6(f) sites include outdoor recreation areas that were acquired or developed with funds from the Land and Water Conservation Fund (LAWCON). Section 6(f) of the Land and Water Conservation Act of 1965 (16 USC 4601) states that property purchased with LAWCON funds should not be converted to other use. If a 6(f) site must be acquired, the law requires that the lands acquired be replaced with other property of at least equal fair market value and of reasonably equivalent usefulness and location.

4.11.1 Affected Environment

Figure 4.11-1 shows the public parks and recreational areas regulated under Section 4(f) and Section 6(f) that exist within the West Side Access study area. All identified properties in the study area are classified as both Section 4(f) sites and Section 6(f) sites. They are:

- Kennedy Memorial Park, West Hartford
- Hartford Public High School (athletic fields and other recreational grounds)
- Day Playscape, Hartford
- Pope Park (with its associated ballfields and community pool), Hartford
- Bushnell Park, Hartford

There would be no impacts on four of the five public parks and recreational areas located within the study area that are classified as both Section 4(f) and Section 6(f) resources; Kennedy Memorial Park, the Day Playscape, and Bushnell Park are all located beyond the limits of construction associated with the Flatbush Avenue and Sisson Avenue interchange modifications. Pope Park in Hartford, located east of I-84, would not be directly impacted by the reeconfigured roadway, but would experience indirect beneficial impacts from improved pedestrian and vehicular connections in the area. The Flatbush Avenue interchange reconfiguration would

include a pedestrian connection between Flatbush Avenue and Howard Avenue that would improve pedestrian access to Pope Park from the south. The Sisson Avenue single point urban interchange proposal includes pedestrian connections between Sisson Avenue, Hawthorn Street, and Laurel Street, as well as a new roadway connection (Boulevard Extended) between Sisson Avenue and Laurel Street. All of these connections would improve access between both sides of I-84 in the vicinity of the Sisson Avenue interchange, with Pope Park indirectly benefiting due to its location to the southeast.

The public athletic fields and other public recreational grounds associated with Hartford Public High School (HPHS) would not be directly impacted by the Sisson Avenue single point urban interchange and associated roadway modifications. However, the extreme southeastern corner of HPHS property would be impacted by the realignment of the western end of Hawthorn Street. As shown in Figure 2.3-4, Hawthorn Street would be realigned to curve towards the southwest and cross Forest Street at-grade at a point south of the existing Forest Street/Hawthorn Street "T" intersection. It would then cross over the extreme southeastern corner of HPHS property prior to eventually intersecting with the new Boulevard Extended.

The impacted area on HPHS property is presently occupied by material stockpiles and construction equipment, and appears to be a temporary staging area for nearby construction. Prior to serving as a temporary construction staging area, the impacted area, was a mix of vacant land and the southeastern corner of a parking lot that no longer exists. Because the impacted area is not principally used for recreational purposes, is located well to the east and southeast of existing recreational facilities, and since it no longer functions as a parking lot supporting these recreational facilities, the impact is not considered to be either a direct use or constructive use of Section 4(f) resources and, therefore, is unlikely to trigger a formal Section 4(f) evaluation.

4.11.2 Environmental Consequences

Because a portion of HPHS property has either been purchased or developed with Land and Water Conservation Fund Act (LWCF) funds, it is classified as Section 6(f) land. According to Section 6(f) of the Land and Water Conservation Fund Act, no property acquired or developed with LWCF funds shall, without the approval of the Secretary of the Interior, be converted to other than public outdoor recreational uses. The Secretary of the Interior shall approve such conversion only if he finds it to be in accord with the existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreational properties of at least equal fair market value and or reasonably equivalent usefulness and location. It is anticipated that to approve an impact to HPHS property, a corresponding land substitution may be required to mitigate the impact. Under the new Sisson Avenue single point urban interchange, the existing Sisson Avenue on- and off-ramps would be eliminated. Some of the land presently owned by ConnDOT and occupied by these ramps may be included in a land swap with HPHS to mitigate for potential HPHS property impacts described above.

With respect to non-recreational Section 4(f) resources, there are no wildlife or waterfowl refuges located within the study area. Additionally, historic resources listed on or eligible for the National Register of Historic Places would not be directly or indirectly impacted by the Build Alternative (See Section 4.10). Based on research of readily available archaeological

information for the study area, it is unlikely that archaeological resources requiring preservation in place would be impacted by the interchange modifications. As such, there are no Section 4(f) impacts anticipated for the Build Alternative.

The No-Build Alternative would not create any impacts on Section 4(f) or Section 6(f) land.

4.11.3 Mitigation Measures

There would be a minor adverse impact on a Section 6(f) property (HPHS). The property acquisition is not an impact regulated by Section 4(f). The section 6(f) impacts to Hartford Public High School would likely be mitigated by the compensatory return of property to HPHS with the removal of the Sisson Avenue ramps.

4.12 Hazardous Materials

An environmental records review was conducted for selected information from the United States Environmental Protection Agency (USEPA) and the Connecticut Department of Environmental Protection (CTDEP) using VISTA Environmental Geographics Data obtained from Environmental Systems Research Institute (ESRI), supplemented by staff research. Search parameters were defined similar to ASTM standards and standard practices for site assessment. Databases included the following lists and records:

- Federal National Priorities or Superfund (NPL)
- Comprehensive Environmental Response Compensation and Liability Act (CERCLA)
- Resource Conservation and Recovery Act (RCRA) Treatment Storage & Disposal Facilities
- Federal RCRA Generators
- Federal Emergency Response Notification System (ERNS)
- Connecticut Department of Environmental Protection (CTDEP) List of Cleanup Sites
- CTDEP Oil and Chemical Spills
- CTDEP Underground Storage Tanks (UST)
- CTDEP Leaking Underground Storage Tanks (LUST)

The study area extends through a heavily developed urban area with a history of industrial and commercial use. Twelve sites within the study area have been the subjects of state cleanup actions, including an NPL site on Capitol Avenue. In addition, 27 generators of hazardous wastes have been actively registered over the past thirty years. Five facilities are listed under the ERNS. The CTDEP lists 23 occurrences of leaking underground storage tanks in the study area. Figures 4.12-1 and 4.12-2 summarize the documented sites of concern in the study area. It should be noted that some sites are classified by more than one registration list.

4.12.1 Affected Environment

Potential construction impacts include the disturbance of hazardous or contaminated materials. Properties within the reconfigured roadway footprint were investigated for their potential to contain hazardous or contaminated materials. Thirty-eight parcels outside ConnDOT right-of-

way were identified within the footprint. These parcels were evaluated based on the database search results, site reconnaissance windshield survey results, a review of land uses, and staff file research. These parcels are shown on Figures 4.12-1 and 4.12-2.

Five properties (seven parcels) identified through the VISTA database research are within the reconfigured roadway footprint and have a high level of risk:

- A metal recycling facility is listed as a State Cleanup Site, meaning that CT DEP is involved in remediation activities or is actively pursuing responsible parties. This property is also classified as a RCRA Small Generator, a facility that generates less than 1000 kilograms per month of hazardous waste. The site appears on the EPA's ERNS, which contains information on reported releases of oil and hazardous substances.

- A former industrial manufacturer is listed as a State Cleanup Site, meaning that CT DEP is involved in remediation activities or is actively pursuing responsible parties. This property is also classified as a RCRA Small Generator, a facility that generates less than 1000 kilograms per month of hazardous waste.

- A second metal recycling facility appears on the EPA's Emergency Response Notification System, which contains information on reported releases of oil and hazardous substances.

A gas station is listed as a State Cleanup Site, meaning that CT DEP is involved in remediation activities or is actively pursuing responsible parties.

- A second former industrial manufacturer is listed as a RCRA Large Generator, a facility that generates at least 1000 kilograms per month of hazardous waste or any amount (greater than 1 kg/mo) of acutely hazardous waste.

The site reconnaissance, a review of present and past land uses, and file searches were factored into an evaluation of whether the new roadway alignment would be likely to encounter oil or hazardous materials during construction. A summary of the evaluation of risk and recommended further action for the parcels identified within the footprint are presented in Table 4.12-1.

Table 4.12-1
Risk of Encountering Hazardous or Contaminated Materials
from Parcels within Build Alternative Right of Way

Location	Relative Risk	Recommended Action
FLATBUSH AVENUE INTERCHANGE		
5 parcels	High	Further investigation; soil sampling
1 parcel	Medium	Further investigation
SISSON AVENUE INTERCHANGE		
15 parcels	Low	Construction precautions
15 parcels	Medium	Further investigation
2 parcels	High	Further investigation; soil sampling

4.12.2 Environmental Consequences

Preliminary assessment of the study area indicates that the potential exists for encountering hazardous waste or contaminated materials during construction. Further investigation would be conducted to determine actual levels of contamination at appropriate sites. All applicable state and federal regulations would be followed to address proper handling and disposal of any contaminated materials.

The No-Build Alternative would not create any impacts to Hazardous Material Sites.

4.12.3 Mitigation of Impacts from Hazardous/Contaminated Risk Sites

Preliminary assessment of the Build Alternative footprint indicates that the potential exists for encountering hazardous waste or contaminated materials during construction. Excavation would be minimized to the extent feasible, contaminated areas would be avoided where possible, and ConnDOT Environmental Compliance standards would be followed. Mitigation measures could include avoidance of contaminated areas, removal of contaminated materials, and remediation.

4.13 Socioeconomics and Environmental Justice Concerns

In Executive Order 12898, issued in February 1994, President Clinton called for federal attention on the environmental and health conditions in minority communities and low-income communities with the goal of achieving environmental justice and furthering the mandate of Title VI of the Civil Rights Act of 1964. In 1997, The US Department of Transportation issued its *DOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations* to summarize and expand upon the requirements of Executive Order 12898.

Transportation projects must meet three fundamental environmental justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.

- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

4.13.1 Affected Environment

Table 4.13-1 shows selected demographic differences between Hartford and West Hartford. Hartford has substantially higher proportions of minorities and a much higher poverty rate than the county or state as a whole. West Hartford, in contrast, has much lower poverty and minority rates than the county or state, though it does have a notably higher percentage of Asian residents. Both communities and the county as a whole have been projected to have a minor loss in

population over a five-year period from 1998 to 2003. Both communities have substantially higher population densities than the county or state as a whole.

Table 4.13-1
Selected Demographic Measures of Hartford and West Hartford

Demographic Measure	West Hartford	Hartford	Hartford County	State of CT
Total Population, 1998	55,995	130,673	824,956	3,271,239
Projected Population, 2003	53,984	126,568	811,828	3,272,149
Population Change, '98-'03	-3.59%	-3.14%	-1.59%	+0.03%
Population/Square Mile, 1998	2,548	7,553	1,122	653
Percent White Population, 1998	88.2%	21.7%	76.8%	81.0%
Percent Black Population, 1998	2.5%	37.4%	10.2%	8.4%
Percent Asian Pacific Population, 1998	4.4%	1.6%	2.3%	2.2%
Percent Hispanic (any race), 1998	4.6%	38.6%	10.5%	8.1%
Poverty Rate, 1990	3.6%	27.5%	7.9%	6.6%
Per Capita Income, 1998	$34,040	$13,271	$24,032	$27,078
Employment in Town/City, 1997	26,390	123,260	489,360	1,581,700
Unemployment Rate, 1997	4.2%	10.0%	5.6%	5.1%

Source: Connecticut Department of Economic and Community Development 1998-1999 Connecticut Town Profiles

Demographic data for environmental justice communities within study area census tracts was collected. The available data is older 1990 census data; year 2000 census data is still forthcoming. 1990 Census tract boundaries are illustrated in Figure 4.13-1. In some cases, especially in West Hartford, the census tracts are mostly outside of the study area, except for the very edge of the tract. Smaller geographic areas (census tract block groups) could not be used because the Census Bureau only classifies minority populations at this resolution, not low income persons. Demographic data relating to census tracts are in Table 4.13-2.

Table 4.13-2
Environmental Justice Communities in West Side Access Study Area by 1990 Census Tract

City/ Town	Census Tract #	Total Population (1990)	Non-white		Hispanic (may be any race)		Below Poverty Line	
			Persons	%	Persons	%	Persons	%
West Hartford	4961	2597	673	26%	353	14%	122	5%
	4967	3379	262	8%	172	5%	286	8%
	4968	3150	342	11%	160	5%	120	4%
	4969	6079	518	9%	351	6%	508	8%
	4971	4048	146	4%	97	2%	206	5%
Hartford	5019	497	249	50%	329	66%	282	57%
	5020	400	156	39%	125	31%	65	16%
	5021	759	131	17%	90	12%	141	19%
	5022	785	366	47%	50	6%	97	12%
	5029	3468	2162	62%	2406	69%	1362	39%

City/ Town	Census Tract #	Total Population (1990)	Non-white		Hispanic (may be any race)		Below Poverty Line	
			Persons	%	Persons	%	Persons	%
	5030	3307	2060	62%	1966	59%	1403	42%
	5031	4824	2683	56%	1101	23%	1200	25%
	5032	148	68	46%	20	14%	42	28%
	5041	1766	549	31%	715	40%	306	17%
	5042	4905	2013	41%	865	18%	734	15%
	5043	3364	1070	32%	1427	42%	985	29%
	5044	3817	932	24%	617	16%	385	10%
	5046	4197	2997	71%	2805	67%	2191	52%
	5049	5482	2295	42%	2527	46%	1188	22%
Study Area Total / Average		**56,972**	**19,672**	**35%**	**16,176**	**28%**	**11,623**	**20%**

As the table shows, there are comparatively low percentages of non-white, Hispanic and low-income persons in most of the West Hartford census tracts. Census tract 4961 in West Hartford does have higher proportions of minority persons than the other tracts, though it has a relatively low percentage of persons below the poverty line. The census tracts in Hartford have much higher percentages of minority and low-income persons, though there is a wide range in variation. For example, the percentage of non-white persons in Hartford census tracts range from 17% to 71%. Similarly, the Hispanic population in Hartford census tracts range from 6% to 67%. Low income percentages in Hartford range from 10% to 57%.

4.13.2 Environmental Consequences

Several low-income housing complexes in Hartford including the Rice Heights and Charter Oak Terrace developments have been demolished. These properties are found in census tracts 5046 and 5049. It is expected, therefore, that the demographic breakdown of these census tracts is substantially different from 1990. This change would be reflected in the forthcoming year 2000 census data.

While much of the study area contains substantial percentages of low-income and minority residents, the Build Alternative would not be anticipated to directly impact on any residential properties other than minor strip takings of property, and no active businesses would require relocations. Therefore, direct impacts on employees or residents would be negligible, and there would not be a disproportionate adverse impact on low-income or minority communities. Instead, the Build Alternative would improve local access and connectivity and reduce the impacts of cut-through traffic in local neighborhoods. Therefore, the Build Alternative should provide net benefits to these populations.

The No-Build Alternative would not create any impacts on Socioeconomics and Environmental Justice Concerns.

4.13.3 Mitigation Measures

The Build Alternative is not anticipated to create disproportionately high and adverse impacts to minority or low-income populations. While the conceptual configuration would traverse some minority and low-income communities (along with non-minority and non-low income areas), net benefits for environmental justice populations are anticipated.

Chapter 5
FINANCIAL ANALYSIS

5.1 Capital Costs

A preliminary engineering estimate was prepared for the Build Alternative. The five kilometer (3.1 mile) long corridor was broken into two separate segments, segments A and B. Segment A, 3.7 kilometers (2.3 miles), is focused of the Flatbush Avenue interchange improvements. Segment B, 1.3 kilometers (0.8 miles), is focused on the Sisson Avenue interchange improvements.

Each estimate was generated using a general format derived from the ConnDOT preliminary estimating procedure, dated April 2001. As described by the estimating procedure, major construction items such as earthwork, pavement, structures, drainage, curbing are quantified and costed out. The summation of costs associated with the major items are then multiplied by a series of factors (percentages) which add additional cost for lump sum items such as clearing and grubbing, mobilization, and minor items. The major items and lump sum costs are added together and then a final set of factors are applied which account for incidentals, contingencies, engineering design costs, utility involvement and rights-of-way impacts. Table 5.1-1 summarizes the estimated capital costs associated with the Build Alternative.

Table 5.1-1
Estimated Capital Costs Associated with the West Side Access Project, Year 2001 Dollars

Item	Segment A: Flatbush	Segment B: Sisson	Total
Construction Costs	$100.5 million	$254.5 million	$355.0 million
Design Costs	$ 7.0 million	$ 18.0 million	$ 25.0 million
Right of Way Acquisition (estimated)	$ 2.0 million	$ 2.0 million	$ 4.0 million
Contingencies	$ 4.5 million	$ 11.5 million	$ 16.0 million
TOTALS	**$114.0 million**	**$286.0 million**	**$400.0 million**

5.2 Funding

There are currently no funds programmed to advance the Build Alternative roadway modifications suggested from this study. The continued development of the conceptual plan presented in this study through environmental documentation, design and construction will require endorsement by the CRCOG in their Long Range Plan and regional Transportation Improvement Program, and inclusion in the State Transportation Improvement Program. Inclusion in these programs results from a cooperative agreement among the towns, regional planning agency and ConnDOT. Projects must compete statewide for limited funds, and programs must be fiscally constrained and in compliance with air quality conformity requirements.

Chapter 6
PUBLIC INVOLVEMENT

The West Side Access Study provided a strong and comprehensive public involvement program building off of the Hartford West Major Investment Study.

6.1 Hartford West Major Investment Study

The Hartford West Major Investment Study that preceded this study also had an active public involvement process. The MIS process contained a public involvement component to provide information, gauge public concerns and receive input. It included five public informational meetings (with cable access broadcast and network TV news coverage), 20 meetings of Advisory Committees, three newsletters, a toll-free hotline, maintenance of a 200-person mailing list, and presentations to study area towns, elected officials, and local groups.

A Technical Advisory Committee and Policy Advisory Committee were established for the MIS study. These committees included representatives from cities/towns, and a variety of regional, state, and federal agencies. These two committees provided oversight for the production of the MIS.

6.2 Advisory Committee

Opportunities for involvement on the Westside Access Study have been provided through activities such as an Advisory Committee, city/town meetings, neighborhood meetings, a toll-free hotline, newsletters, and a website.

The Advisory Committee for this study includes representatives from:

- Federal Highway Administration
- U.S. Fish & Wildlife Service
- U.S. Army Corps of Engineers
- Connecticut Department of Economic and Community Development
- Federal Transit Administration
- U.S. Environmental Protection Agency
- CT Transit
- Connecticut Department of Environmental Protection
- Connecticut Office of Policy & Management
- Capitol Region Council of Governments
- Connecticut Department of Transportation
- City of Hartford
- Connecticut State Historic Preservation Office
- Town of West Hartford
- Aetna Insurance
- Hartford Neighborhoods:
    - Asylum Hill
    - Frog Hollow

- Parkville
- West End
- Behind the Rocks

The role of the Advisory Committee is to provide input to the study to act as contact for government agencies, businesses, and neighborhoods, and to review and help steer the progress of the study. The Advisory Committee has thus far met on three occasions,

6.3 Public Outreach

In order to provide adequate opportunities for the public to be informed about this study, and to solicit public information, the following public communication media were used:

6.3.1 Meetings

Several informal discussions and meetings were held through out the study process to get localized input from the immediate area. While the general public was invited, this process targeted specific localities, either through targeted mailings, contacting neighborhood groups to get members, or through lists of people provided by city/town staffs.

A Public Information Meeting was held at Hartford Public High School in September 2001 so that each of the five neighborhoods could attend. There was a formal presentation to discuss the Build Alternative of the West Side Access study.

The following list shows all public involvement meetings/presentations that were held during the study process:

- Advisory Committee Meeting, June 22, 2000
- Meeting with emergency service providers, August 23, 2000
- Presentation to Behind the Rocks (Hartford) Neighborhood, September 18, 2000
- Presentation to Parkville Neighborhood, September 19, 2000
- Presentation to Asylum Hill (Hartford) Neighborhood, October 2, 2000
- Presentation to West End Neighborhood, October 10, 2000
- Advisory Committee Meeting, November 13, 2000
- Meeting with City of Hartford, November 29, 2000
- Meeting with Farmington Avenue Joint Committee, December 7, 2000
- Meeting with City of West Hartford Staff, December 8, 2000
- Presentation to Parkville Neighborhood, December 14, 2000
- Presentation to Asylum Hill, West End and Fog Hollow Neighborhood, January 11, 2001
- Meeting with City of Hartford, March 14, 2001
- Advisory Committee Meeting, March 22, 2001
- Presentation to Behind the Rocks, July 16, 2001
- Meeting with the City of Hartford, July 28, 2001
- Meeting with the Neighborhood Representatives, July 31, 2001

6.3.2 Newsletter

A newsletter was produced in April 2001 to publicize the study. This newsletter was mailed out to a growing list of interested parties. The current mailing list presently contains almost 150 members.

6.3.3 Web Site

A web site, www.westsideaccess.com, was maintained continuously throughout the study and the information that evolved on the web site changed and grew as the study developed over time. The web site offered a way for the public to communicate with the study team.

An e-mail account, westsideaccess@wilbursmith.com was maintained and monitored throughout the process. This e-mail account was listed on the web site.

6.3.4 Hot Line

A toll-free telephone hotline, 1-800-786-2191, was maintained during the study for the purposes of receiving comment or questions orally. The hotline received regular use.

Chapter 7
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